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1954

WESTERN AUSTRALIA

REPORT

of the

Commissioner of Public Health

for the year

1952



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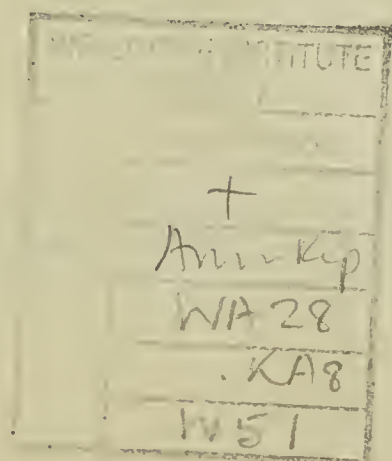
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Report of the Commissioner of Public Health.

To the Honourable the Minister for Health.

I have the honour to submit the Report of the Department of Public Health for the year 1952.

ADMINISTRATION.

A Public Health Department is entrusted with the responsibility of advising a Government authority concerning the means necessary to improve the public health of the community.

Public health has a broad definition and may include any factor which influences the sense of well-being and happiness of a people. The term "social medicine" should perhaps be more universally used and applied to the social factors and influences affecting the health of a people.

To all who have followed the evolution of the conception of public health, it is apparent that the activities of the Public Health Officer overlap with those of other workers in sociology and that an earlier idea that they are concerned only with the control of sanitation and infectious diseases is completely outdated.

The professional staff of a Public Health Department must be constantly reassessing its aims and the weapons which are used to attain these aims. It should be constantly informed of the latest developments in medicine and be aware of conditions in active medical practice.

The new techniques which are developed in medicine must be viewed in relationship to preventive methods and integrated into the activities of a Public Health Department.

A Medical Officer for Health must be constantly alert to the problem as to whether the Health Authority is obtaining proper value for the money which it is spending on the improvement of the public health.

There is one person only who is in a position to estimate the value for money spent, and that is the medical man responsible for advising the health authority. He, alone, can determine the relative values of alternative choices of expenditure of public monies on health. If he is conscientiously performing his duty, he must therefore be continuously re-examining existing avenues of expenditure and exploring new ones to see if they might not give a better return.

Experience in the past has shown that the public needs to be educated before it is prepared to accept what might appear in the first instance to be expenditure of perhaps a large amount of public money on a project, the outcome of which might not be immediately clear.

It has been said, however, that "public health can be bought"—if one is prepared to pay the price and if the money is spent in the right direction.

An example of this has been afforded in recent years by the Commonwealth campaign for the control of tuberculosis. This commenced in 1948 and at the present, the annual expenditure on tuberculosis in this State is £469,882. This is a very large sum but an examination of the fall in the death rate of the disease in recent years shows that this money has been well spent. Thus, the death rate has fallen from 38·1 per 100,000 in 1939 to 30·8 in 1948 and 12·5 in 1952.

Once the inertia of the public has been overcome and a public health programme decided on and put into effect, there is a danger that there may be a tendency to continue with this course of action when there are adequate and proper reasons for either curtailing or abolishing it or replacing it with other activities which may yield a better result.

An example of this may be quoted in the development within the past 20 years of our Infant Health services. There can be no doubt that this State has, on the whole, a good Infant Health service and that this has been achieved by the co-operation of the public and Local Authorities with the Public Health Department.

It has been pointed out in earlier Annual Reports and is to be pointed out again in this Report that, although it is essential to continue with routine Infant Health activities to control the health of children between the ages of one month to twelve months, there is an urgent need to pay increasing attention to the causes of death of infants under the age of one month and to related abnormal conditions in the mother before the birth of her child.

Routine Infant Health activities have now become largely accepted by the public and are in common practice as a social habit of the community. Nevertheless, it behoves a Public Health Department to enquire into the causes of ill-health and death in infants under the age of one month and to relate these to the condition and health of the pregnant woman and of the unborn child.

It is therefore contended that an understandable desire to expand the activities of Infant Health Centres, with a consequent increase of expenditure of money for this purpose, may be attained at the expense of a more fruitful and desirable expenditure on the period of earlier infancy, the unborn child and the pregnant woman.

It may be difficult for a local or a central government authority to resist the pressure of public opinion which may be uninformed in these matters. It is, however, the responsibility of professional officers of a Health Department to draw attention to this danger and to indicate the lines of a more profitable expenditure of funds.

Similarly, in a School Medical Service, the public has been educated to accept without question the need for the routine medical inspection of children. There may, however, be means of achieving the same or even better results by a modification of the system formerly in use. This modification may jolt public habits and may be resisted. Nevertheless, it is the responsibility of a Public Health Authority to persist in what it considers to be an improvement in its methods.

STATE HEALTH COUNCIL.

During the year ended 31st December, 1952, three meetings of the State Health Council were held and two meetings of the Hospital Requirements Committee. It was not found necessary to call a meeting of the Infant and Maternal Health Committee.

It is gratifying to record that the resolutions and recommendations made by the State Health Council have received very careful consideration by the State Government. Unfortunately, the gravity of the financial position prevented action on all the State Health Council's recommendations regarding hospital building construction.

The following are some of the important matters approved by the Government on recommendations made by the Council :—

Establishment of an ophthalmic service for school children.

Financial assistance for the provision of contact lenses for those persons who genuinely require them and are not in the position to meet the high costs involved.

Establishment of a clinical research unit at the Royal Perth Hospital.

Other recommendations which are receiving consideration by the Government include :—

(a) the provision of increased accommodation for private and intermediate patients in hospitals so that medical practitioners would be able to render services to intermediate and private patients who were able to pay for their medical attention in the beds set aside for such purposes in all public hospitals ; and

(b) offering of bursaries for nurses on similar lines to those in operation in the Education Department, in which selected candidates are paid a small annual allowance during their studying period before commencing actual training at the Teacher's College, on condition that when qualified they enter the teaching profession in this State. This recommendation is designed to stimulate enrolment of students in the nursing profession.

The Council gave consideration to a resolution by the World Health Organisation that the use of heroin be abolished. A strong recommendation was made by the Council to the British Medical Association that the necessary action should be taken to discourage the use of that drug. The recommendation has since been implemented.

LOCAL AUTHORITIES.

The slow process of persuading some Local Authorities to accept their responsibilities under the Health Act is proceeding. In some instances, the appreciation of these responsibilities on the part of the Local Authority is either primitive or non-existent. The reluctance to impose or increase a health rate is an indication of this. The need to control elementary sanitation is not realised. This may be considered the first step in public health control and necessitates the appointment of a health inspector. This appointment may be made by the Local Authority on its own or by the combination of groups of Local Authorities to form regions, with the appointment of a health inspector to the region.

An instance of the reluctance of some Local Authorities might be quoted. One Road Board which obtained the occasional and part-time service of the inspector of a neighbouring Local Authority, protested that this service was adequate for its needs. On examination, it was found that the inspector spent an average of twenty minutes every month on this duty.

This recalcitrant Board was then discovered to be permitting the pollution of a stream by the surface washings of a piggery as well as by the presence of dead pigs in the stream, a few hundred yards up-stream from a township within its boundary. The local hotel in the summer months pumped water from this stream for use in the hotel bar for the washing of beer glasses.

When the attention of the Local Authority was drawn to this contamination of the beer glasses of its adult males, it realised the position, although this eagerness to appreciate a sanitary defect had not been shown previously in the risks associated with the contamination of such food as milk used for babies.

Experience shows that this process of education must apparently be slow but, in comparison with other countries where public health supervision is well organised, the ignorance and apathy of some of the State's Local Health Authorities is a reproach to the public conscience.

The organisation of the combination of Local Authorities into regions proceeded during the year, with the following results :—

Bridgetown	} became the HESTER Regional Health District.
Greenbushes	....	....
Nannup	....	....
Gingin	} joined the NEWCASTLE Region.
Goomalling	....	....

There are at present the following regions :—

Plantagenet	Toodyay	} NEWCASTLE
Gnowangerup	....	....	Victoria Plains	....	....
Broomehill	....	....	Chittering	....	....
Cranbrook	....	....	Gingin	....	....
Tambellup	....	....	Goomalling	....	....
Kent				
Denmark	Bridgetown	} HESTER
			Greenbushes	....	....
			Nannup	....	....
Geraldton-Greenough						
Irwin	Pingelly	} DALE
Northampton	....	....	Beverley	....	....
Upper Chapman	....	....	Brookton	....	....
			Marradong	....	....
			Cuballing	....	....
Kellerberrin	Wickepin	
Cunderdin	Wandering	
Tammin	Williams	
Quairading	Corrigin	

HEALTH INSPECTORIAL STAFF.

The following notes have been prepared by Mr. A. C. Stephens, the Chief Health Inspector.

During this year the Department has not been able to increase the number of inspections of food, and inspections for Local Authorities to which we were committed. Inspections have been made by the Inspectorial Staff of the Murchison and North-West areas of the State.

The Seventh Annual Conference of Health Inspectors was held on 10th and 11th July in the Supper Room of the Perth Town Hall. The Conference was opened by the Hon. Dame Florence Cardell-Oliver, Minister for Health. Lectures and addresses were given to a large gathering of members.

Address : By Dr. Linley Hensell, Commissioner of Public Health.

Lecture : By Dr. D. J. R. Snow, Epidemiologist, Department of Public Health.

"The Epidemiology and Public Health Implications of Infective Hepatitis."

Talk : By F. St. J. Barber.

"The Tea Bureau and Cafe Trade."

Talk : By Mr. C. Klem of the Engineering Section of the M.W.S.S.D. Department on :

“Disposal of Trade Wastes and Effluents.”

Lecture : By Miss Margaret Feilman.

"Some Aspects of Town Planning in Relation to Public Health."

Food samples submitted during 1952 :—

Samples submitted during 1902.								Number failing to comply with Regulations.
								Number of Samples.
Chemical and Bacteriological Analyses—								
Water	....	....	....	....	....	....	65	18
Bread	....	....	....	....	....	....	1	....
Flock	....	....	....	....	....	....	1	....
Milk ....	....	....	....	....	....	....	12	....
Sardines ....	....	....	....	....	....	....	1	....
Total Bacteriological							80	18

Chemical Analysis—							Number of Samples.	Number failing to comply with Regulations.
Lemon Butter	....	....	....	....	....	....	2	....
Fish	....	....	....	....	....	....	1	1
Liquorice	....	....	....	....	....	....	1	....
Vinegar	....	....	....	....	....	....	8	7
Sausages	....	....	....	....	....	....	2	....
Conserve	....	....	....	....	....	....	1	....
Mincemeat	....	....	....	....	....	....	3	2
Lemonade	....	....	....	....	....	....	1	....
Tripe	....	....	....	....	....	....	2	2
White Pepper	....	....	....	....	....	....	1	....
Lard	....	....	....	....	....	....	1	....
Beef Dripping	....	....	....	....	....	....	1	....
Butter	....	....	....	....	....	....	2	1
Apples	....	....	....	....	....	....	2	....
Pears	....	....	....	....	....	....	1	....
Condensed Milk	....	....	....	....	....	....	2	....
Milk	....	....	....	....	....	....	60	16
Total Chemical							91	29

Prosecutions.

Health Act—V.D. Section.

Costs : £2 3s. Fines : £5. Bond : £10.

Imported Fish.

Fish of a total weight of 1,307,040 lb. was imported. The inspection fees amounted to £398 7s. 11d.

Condemnations.

Appended hereunder are details of food condemned at the Fremantle Wharf by the Department's Inspector.

20 Boxes Smoked Herrings—Putrefaction.	}	Bitumen Taint.
100 Smoked Cod Fillets—Prohibited Dye.		
198 lb. Mutton		
391 Beef		
50 lb. Poultry		
321 lb. Bacon		
391 lb. Butter		
35 lb. Cheese		
4 lb. Margarine		
10 lb. Lard		
112 doz. Eggs		

Septic Tanks.

Six thousand one hundred and forty-five permits were issued for septic tanks at £1 and 164 permits were issued for septic tanks at a fee of £2 each. The total revenue was £6,473, of which £3,196 6s. was paid to the respective Local Authorities, and the balance of £3,276 14s. to the Department.

HEALTH OF THE NATIVE POPULATION.

The state of the health of the native population continues unchanged.

Housing and proper living conditions are the basic needs, to which attention should be paid.

In an effort to improve the living standard of the natives in the Kimberleys, a special hygiene school was conducted in the course of the year at Moola Bulla Station. Mr. Britten, a Senior Health Inspector of this Department, conducted this course.

It is hoped that the instruction which was given in this course will result in a beginning of an improvement in the hygienic standard of the natives in the northern part of the State.

The following is the text of a report which has been prepared by Mr. Britten :—

“ A Hygiene Inspectors School for Natives was held at Moola Bulla between the 21st July and 1st August, 1952.

Altogether 15 natives attended the course, nine being from Stations and Missions, five from Moola Bulla and one an employee of the Department of Native Affairs, Wyndham.

The Mission Natives attending came from Wotjulum (late Kunmunya), Forrest River and Beagle Bay.

Station Natives came from Kimberley Downs, Meda, Flora Valley, Ord River, Gordon Downs and Billaluna.

All natives were very attentive and appeared to be anxious to learn and although the class started at 7 a.m., continuing to 5 p.m., with the usual meal breaks, none appeared bored or tired.

Three in the class were outstanding, being quick to understand and appeared fully to appreciate the situation. These came from Moola Bulla, Forrest River Mission and Wotjulum Mission.

Instruction consisted of the following :—

1. Cause of disease and means of transmission, with particular emphasis on hookworm, and the preventative measures.
2. Flies as carriers of disease.
3. Animals as carriers of disease (particularly hydatids by dogs).
4. The life cycle of flies and mosquitoes, and how to attack the problem.
5. Water sources and protection against pollution.
6. Latrines, the various kinds, with emphasis on the down draught incinerator made from a 44 gallon drum.
7. Rubbish disposal.
8. Building construction.
9. Personal and camp cleanliness.
10. Simple drainage.

Practical demonstrations were given in the construction of a refuse incinerator and an incinerator latrine, surface drains, etc.

Much use was made of the blackboard for illustrations which it was quickly discovered was the best means of communication with the lesser educated students.

There was a big variation in the ages of students, which ranged from 16 to 55 years, the majority being over 35, and the standard of education varied as much as the ages.

It is felt that all natives who attended have benefited from the course. The few Stations which availed themselves of the opportunity of this free education for their natives did so with the full realisation that the older men commanded more respect among their fellows than the youngsters. This does not, of course, apply altogether to Missions where there is more supervision. The younger man who is more educated is better equipped to learn and can report to the Superintendent without fear of retribution from his fellows, as appears to be the case in some tribal areas.

It is hoped that the Stations and Missions concerned will take advantage of the knowledge gained by the natives and use them in an endeavour to improve the sanitation of the camps and stations from which they came.

It is considered that this School was a success from the point of view of natives' hygiene, and it is hoped that the trained native, now he has returned home, will be used to the best advantage and thereby assist in helping the other natives to help themselves."

PUBLIC HEALTH LABORATORIES.

(Appendix I.)

Particular attention should be paid to the report of the Director of the Medical Laboratories, Dr. Young.

The overcrowding in the laboratories is gross and has reached the stage when it interferes with accuracy in reporting. It is also a potential danger to the health of the laboratory staff.

With the increase in the population and developments in the medical sciences, the demand made on the laboratory services is constantly increasing. The position becomes worse every year and is now critical.

The time has come when urgent consideration must be given to the separation of the Public Health Laboratories from the laboratories of the Royal Perth Hospital. This will of necessity involve the building of a separate Public Health laboratory, which might preferably be placed at the site of the future Medical School.

Another important point which is made by Dr. Young is that in the laboratories there is an insufficient number of medical personnel in proportion to the technical non-medical staff. The proportion at the present is as 1 to 10. It is desirable to increase this proportion to perhaps 1 to 3 or 4.

It is difficult to recruit medical men into the laboratory service of this country because of the inadequacy of the salaries offered. This problem should be faced.

TUBERCULOSIS CONTROL BRANCH.

Appendix II.

In his Report (Appendix II.), Dr. Alan King, the Director of the Tuberculosis Control Branch of the Department, draws attention to the continued fall in the death rate from the disease.

Some of the death rates in recent years are as follows :—

1939	38.1	} per 100,000 population,
1945 ....	....	....	30.5
1950 ....	....	....	22.3
1951 ....	....	....	13.1
1952 ....	....	....	12.5

There can be no doubt that this gratifying fall has been due to :—

- (a) the intensity of the case-finding programme whereby cases are detected earlier and in a more treatable stage ;
- (b) the efficacy of the treatment which is given.

However, there is a possibility that one of the effects of treatment is to prolong life, and that some of those whose lives have been spared for the present will ultimately succumb. A further dramatic fall in the death rate is not anticipated for the present.

Attention should be drawn to Dr. King's remarks on the large number of cases which have had to be readmitted to hospital for further treatment because of relapse. This has been caused by the shortage of beds which has led to a policy of discharging patients earlier than desirable in order to admit new cases recently discovered and to shorten the waiting list. More beds are needed, but this position will be remedied when the new Chest Hospital is built.

As in previous years, emphasis must be placed on the satisfactory position regarding the co-operation of medical men in private practice with the medical staff of the Branch. An increasing number of patients is being referred because of suggestive symptoms and the medical profession in general is appreciative of the need and the methods for tuberculosis control. Their co-operation and also that of the public hospitals in this State is warmly appreciated.

The Branch is embarked on an intelligent and balanced course of control embodying due attention to case-finding, treatment and prevention, and undue emphasis has not been placed on any of these important aspects of the problem at the expense of any other aspect. The preservation of this balance is important and may be continued by ensuring that the one authority is responsible for all three.

The gratitude of the Department must be expressed to the Tuberculosis Association of W.A. for their active role in rehabilitation. The stimulus which is given by the incorporation of a voluntary body in this respect cannot be over-emphasised.

CANCER RESEARCH LABORATORY.

The work at the Laboratory continues on the lines which had been laid down in the previous year.

The Laboratory and the Department suffered an irreparable loss by the sudden death of Professor Gye in October.

The State was fortunate to secure the services of Dr. Gye, who was one of the most distinguished cancer research workers in the world, and the inauguration of the Laboratory in 1951 had offered hope that he might be able to carry to completion certain cancer research which he had commenced in London. Before his death he had prepared a programme which has been carried out since by his wife, Professor Ida Mann. The report of the work for the year has been prepared by her (*see* Appendix VI.).

STAFF PUBLICATIONS.

The practice of including in this Report abstracts of publications by members of the staff of the Department during the year, is continued. (*See* Appendix VII.)

COMMUNICABLE DISEASES.

Dr. D. J. R. Snow was appointed as the Department's Epidemiologist on 10th December, 1951. 1952 has therefore been the first year in which problems associated with eipdemiology have been given that attention which they need.

It is a pleasure to record a tribute to the manner in which Dr. Snow has approached the responsibilities of this appointment and to the change in the outlook of the Department on the control of communicable diseases.

In his report, Appendix VIII., he comments on the continuing epidemic of infective hepatitis—an epidemic which has been almost world-wide in recent years. There is little that can be done in the way of control, but the public must be warned once more of the importance of personal hygiene and of the cleanliness of the hands, particularly after visits to the toilet.

The incidence of poliomyelitis remains low—a result which may be attributed to our good fortune. Nevertheless, this State might well have the experience of other States in which epidemics have continued within recent years.

The Physiotherapy Board will have been in operation for three years at the end of 1953 and, by that time, a supply of trained physiotherapists will be available and should prove of great assistance if there should be an increase in the incidence of this disease.

Although diphtheria continues to be present at a low incidence, one should not be complacent as this is a disease which, if the public were completely co-operative in seeing that the children of the State were all immunised, would produce no death rate at all.

Dr. Snow has continued his enquiries into the history of some communicable diseases in Western Australia and a further report is included in Appendix X.

ARGENTINE ANTS.

An extremely interesting report has been prepared by Inspector Flower on the measures taken during the year for the control of Argentine Ants. (*See Appendix XI.*)

Towards the end of the year supplies of chlordane were made available and intensive campaigns to eradicate the ants were made in a selected area of South Perth.

Concurrently, other measures were taken to control the spread of the ant in other parts of the metropolitan area and of the State.

It will be seen from Inspector Flower's Report that it is probable that the chlordane treatment, as used in South Perth, might well eradicate this pest. However, further observations in the next season will be needed before a definite opinion can be given concerning the efficacy of the treatment.

MATERNAL HEALTH.

In the course of the year there were 15,413 live births and 18 maternal deaths. This gives a rate of 1·17 per 1,000 live births.

The following table compares this rate with those of other States and other countries :—

Queensland (1951)	....	....	1·18
Western Australia (1952)	....	....	1·17
• South Australia (1950)	....	....	1·16
New South Wales (1950)	....	....	1·12
Victoria (1951)	....	....	0·99
England and Wales (1950)	....	....	0·89
United States of America (1950)	....	....	0·83
Minnesota (U.S.A.) (1951)	....	....	0·3

(All rates per 1,000 live births, deaths from all causes.)

It will be seen that in Australia and in our own State we have little to be proud of in this record. Furthermore, it is calculated that the 1952 rate for England and Wales was 0·62, and particular reference should be made to the rate in Minnesota. In the latter state, a vigorous approach has been made to the problem of ante-natal care and the handling of complications and anticipated complications occurring in the pregnant woman.

In earlier reports it has been pointed out that the fall in the death rate of infants between the ages of one month and 12 months in the past 30 years has not been paralleled by a corresponding decrease in the death rate of infants up to the age of one month and in the still-birth rate.

There can be no doubt that increased attention is needed to this aspect of the protection of life and the matter is in the course of active exploration by the Department.

INFANT HEALTH.

In her Report (Appendix XII.), Dr. Stang, the Medical Supervisor of Infant Health, comments on the continued progress of the Service, which may be regarded as efficient and producing results.

Some Infant Mortality Rates in other States and countries are shown for the purpose of comparison with Western Australia.

Death Rates per 1,000 Live Births (nearest whole number)—1952.

Western Australia	....	....	25
Victoria	....	....	22
England and Wales	....	....	28
United States of America	....	....	29
Denmark	....	....	29
Sweden	....	....	20
New South Wales	....	....	25
Queensland	....	....	25
South Australia	....	....	23
Tasmania	....	....	22
Switzerland	....	....	29
Scotland	....	....	35
France	....	....	45
Italy	....	....	64

A pleasing feature of developments in recent years has been the interest which is being progressively shown by Local Authorities in Infant Health work. Some Authorities are prepared to erect buildings in co-operation with the Lotteries Commission. This policy is to be encouraged as a local interest in Infant Health work is extremely important and is in accord with the policy of this Department to strengthen the responsibility of the Local Authorities in public health affairs.

Although the position regarding the death rate of infants between the ages of one month and one year is, on the whole, satisfactory, the death rate of infants under the age of one month, and particularly in the first week of life (the neo-natal mortality rate) is not so good. The position in this State is, however, no worse than it is in other States.

The causes of this neo-natal mortality are often identical with the causes of stillbirth and are related to the health of the mother in her pregnancy. In order to effect a reduction, increased attention will be necessary to the ante-natal care of the mother. This may be illustrated by the fact that it is estimated that seven per cent. of all infants born alive are premature and that 60 per cent. of deaths of infants under the age of one month are associated with prematurity. It will be apparent that many of the problems associated with death in early infancy have their origin in the health of the mother during her pregnancy.

The practice of giving Mothercraft lectures to the upper classes in Girls' Schools is to be actively continued.

SCHOOL MEDICAL SERVICE.

This service has progressed in recent years and continued to do good work. The Department is at present considering how its efficiency may be increased and how the time of the Medical Officers may be spent to better advantage.

Although the desire of parents and the public, as expressed by the requests of local Parents and Citizens' Associations, for more frequent medical examination may be taken as a compliment to the service as a whole, it is thought that frequent routine medical examinations of every school child is unnecessary and inefficient. It is obviously undesirable to employ highly trained Medical Officers to examine repeatedly normal healthy children.

Proposals are being prepared to provide for a more selective examination by the doctor and for an increasingly important role of the Department's school nurses in the selection of cases for medical examination.

SCHOOL DENTAL SERVICE.

In his Report (Appendix XVI), Mr. McKenna, the Senior Dental Officer for Schools, draws attention once more to the difficulty being experienced in the recruiting of Dental Officers for the service. In spite of the fact that the University of Western Australia provides a course in Dental Science of a high standing, the number of graduates produced every year is disappointingly small.

With the better prospects available in private practice, it is not surprising that the conditions of appointment to the School Dental Service are not popular with dental graduates.

The standard of dental health of the children of this State continues to be depressingly low. Two-thirds of the children examined are found to need treatment.

The following table shows number of treatments given per child and number of children examined and treated annually by each Dental Officer in Western Australia as compared with Victoria, Queensland and New Zealand :—

	W.A.	Queensland.	New Zealand.	Victoria.
A. Treatments per child	5.3	4.9	7.3	3.0
B. Number of children examined and treated per dentist per year	591	Number of Staff not given	406	671

(It should be noted that the facts given in B. deal only with children who have been examined and then given treatment. There would be many other children who were examined but received no treatment for reasons such as : (1) No parental consent, and (2) No decayed teeth. In W.A. these extra examinations involved an average number of 300 per dentist per year).

As in the case of the School Medical Service, the uninformed importunity of Parents and Citizens' Associations is embarrassing. Even though the position has been repeatedly explained with the utmost clarity, requests are being continually received to have the Dental Officers perform the impossible and to do a far greater volume of work than is possible with their limited number. With the limited staff at our disposal, it is considered that the maximum use of their services is being obtained. It is useless for local groups to request preferential treatment of the Dental Officer's time. The amount of work which it is possible to do in the school population is obviously limited by the number of Dental Officers available.

NORTH-WEST MEDICAL SERVICE.

The service has continued as in former years and offers a good cover to the population in the Kimberleys and the North-West.

The treatment of Hansen's Disease at the Leprosarium at Derby continues and is yielding excellent results. Reference should be made to the Report by the Deputy Commissioner of Public Health, Dr. Davidson, Appendix XVII. It will be seen that the modern methods of treatment recently introduced are giving very hopeful results and that in 1952, for the first time, the number of discharges from the Leprosarium exceeded the number of admissions.

Further attention must be drawn to the highly desirable result that the aborigines in the Kimberleys now no longer fear to enter the Leprosarium for treatment lest they never leave the institution, but even offer themselves for examination and treatment if they have a suspicion that they might have contracted the disease.

Dr. Davidson and Dr. Grigoroff are to be congratulated on this excellent result.

REPORT OF PRINCIPAL MATRON—APPENDIX XVIII.

In March, 1952, Miss P. F. Lee was appointed to the position of Principal Matron of the Department.

Miss Lee had during the year 1951 attended and passed in the course of Nursing Administration at the College of Nursing, Australia, in Melbourne.

In an endeavour to improve the quality of our nursing service and administration, the Government had, in the year 1950, agreed to the appointment of four scholarships annually to the College of Nursing, the scholars on return from the course undertaking to work in approved hospitals in the State for a period of two years.

The Department was fortunate to secure the services of Miss Lee, who had formerly been the Assistant Matron at the Royal Perth Hospital for four years.

In the course of the year, Miss Lee inspected as many of our country hospitals as was practicable. It is anticipated that, as a result of her activities, there will be an improvement of the quality of the nursing service in these hospitals and, also, a raising of the standard of the training of nurses in such hospitals as carry out this training.

NURSES REGISTRATION BOARD—APPENDIX XIX.

In the course of the year, the Nurses' Registration Act was amended to provide for the training of Nursing Aides.

Untrained nursing assistants have been employed in our hospitals for many years. These girls undertake their duties without any previous training of any kind.

The problems associated with the staffing of our hospitals are linked with the standard of the training of their nursing personnel.

It has long been thought in our own and in other countries that it is uneconomic to attempt to staff a hospital with a nursing staff, all of whom are fully trained nurses. It is estimated that 66 per cent. of the nursing services performed on the average patient in a general hospital may adequately be performed by a nurse who is not so highly trained as the trained nurse.

For these reasons it was decided to institute a new type of nurse—the Nursing Aide. Her course of training is to extend over a period of twelve months, at the end of which she will submit to an examination conducted by the Nurses' Registration Board.

Next year it is anticipated that this training will commence at the Royal Perth Hospital and at the Merredin Hospital in the country.

VENEREAL DISEASE—APPENDIX XXIV.

There has been a decline in the reported incidence in the year of syphilis and gonorrhoea. The fall has been, in the case of syphilis, from 66 to 39 and in gonorrhoea from 338 to 218.

There is reason to believe that perhaps all cases receiving treatment are not notified, even though the name of the patient is not mentioned in the notification.

CONCLUSION.

I wish to express my appreciation to you, Sir, for your sympathetic approach to the work of the Department, and to the staff for their willing and whole-hearted support and efforts throughout the year.

LINLEY HENZELL,

M.D. (London), B.Sc., D.P.H., Commissioner of Public Health.

APPENDIX I.

ANNUAL REPORT FOR 1952.

PUBLIC HEALTH LABORATORIES.

WESTERN AUSTRALIA.

To The Commissioner of Public Health, Western Australia.

The following report is submitted on the work of the Public Health Laboratories situated in the Royal Perth Hospital, the King Edward Memorial Hospital and the Dental Hospital during the year 1952.

The year's work has been characterised by the constant increase in all branches of clinical laboratory work, the predicted congestion and overcrowding of the existing laboratories, the continually increasing disproportions between senior trained technical staff and junior technical staff, and between medically qualified and technical staff and the curtailment rather than expansion of public health laboratory work owing to the intense pressure of urgent clinical pathological investigation partly, but not entirely due to the development of the Clinical Research Unit in the Royal Perth Hospital.

The congestion in the laboratories has reached a stage which is not only damaging to the efficiency of the laboratory services but is definitely deleterious to the health of the laboratory workers. Every possible palliative measure has been used and every square foot of space utilised to relieve congestion. But towards the end of the year some less important clinical investigations had to be cut out and a climax was finally reached when hospitals were presented with the problem of reduced laboratory investigations and the retardation of all scientific progress unless further laboratory space was made available.

The Subdivision of the Public Health Laboratories from the Laboratories of the Royal Perth Hospital.—The separation of the work of the two laboratories, which was combined as a matter of temporary convenience when the new Perth Hospital was opened in 1948, has now become a matter of extreme urgency.

This separation is essential both for the development of further laboratory services for the Royal Perth Hospital and for the complete re-orientation of public health laboratory services for Western Australia including, in addition to routine examinations, full investigation of all epidemic and industrial diseases, the control of water supplies, sewage disposal, river waters and all problems of food hygiene and other related problems.

The plan of this separation necessitates the building of a separate Institute of Hygiene or Preventive Medicine with animal house accommodation and considerable extensions to the Laboratory accommodation of the Royal Perth Hospital either in the form of a new laboratory block or Institute of Pathology or the internal extension of laboratories in the new wings of the hospital with additional animal house accommodation.

The formation of a joint Advisory Committee on Laboratory Services representing the Public Health Department and the Hospital Board with the Staff of the Royal Perth Hospital to deal primarily with the overall increases of laboratory accommodation and the separation of the two branches of the laboratories was planned.

General Staffing.—The appointment of senior biochemist remained vacant throughout the year, but Dr. D. H. Curnow was appointed late in the year and will commence duty on his return from Europe in 1953. No suitable candidate for the appointment of haematologist has so far been heard of. A whole time appointment of a medically qualified haematologist to the haematology laboratory to fully co-ordinate its work with the clinical department is urgently needed.

Three graduate technicians, one in biochemistry, one in bacteriology, and one at the King Edward Memorial Hospital laboratory were appointed, and three temporary graduate technicians were employed. One laboratory assistant was appointed to the K.E.M.H. laboratory and two temporary laboratory assistants were also employed at the Royal Perth Hospital. Three technicians, two with considerable experience resigned during the year. The recruitment of senior technical staff with experience is still a matter of great difficulty. This could be immediately improved if adequate housing in the form of married quarters could be provided for technicians coming from other States in Australia or from overseas. Experienced candidates for vacancies are available. An organised staff housing scheme would remove many of the staffing problems.

The method of recruitment of new staff and staff to fill vacancies caused by resignations apart from the scarcity of suitable staff, is so slow and cumbersome that some possibly suitable applicants are lost by these delays and vacancies remain for long periods unfilled. Where work is done under constantly increasing pressure this slowness in the recruitment of staff has become one of the major hindrances to progress.

Dr. L. Szaloky continued his training for a post of pathology registrar throughout the year.

With the appointment of a new senior typist in February, 1952, and the build-up of an almost entirely new office staff, the office section showed a very marked increase of efficiency. With the constant increase of work and the complexity of reporting, it is difficult to maintain the highest standard of office efficiency until an office staff of a more permanent nature can be built up. Five appointments and four resignations from the office staff show the present transient nature of employment there, and the difficulties of maintaining a contented staff under existing conditions. The congestion in the office is as acute as it is in the laboratories and the separation of telephone inquiries and inquiry counter from the main office is now urgently needed.

The Health of the Staff.—The incidence of respiratory infections remained at a high level, especially in the winter.

All new staff was Mantoux-tested and B.C.G. inoculation was arranged for Mantoux negatives before work in the tuberculosis laboratory was permitted.

The Cadet Trainee Scheme.—Two cadets were appointed to the five-year course of training to qualify as technicians. One of these resigned for private reasons. The number of cadets now being trained is five, two in the first year, two in the second year and one in the third year. This number is considerably below the future requirements of trained technicians for Western Australia, both in the Perth area and in the future laboratories of country hospitals. A minimum intake of three per annum is required.

The progress made by the cadets under training is good. The system of rotation from section to section appears to give a sound all-round training, and the courses of instruction given by the West Australian Branch of the Australian Association of Laboratory Technicians to the senior cadets forms a very valuable background of theory and special practice to the general experience in the laboratories.

The Staffing of Sectional Laboratories.—Miss Silvester returned from a valuable period of unpaid study leave in the Eastern States to the biochemistry laboratory. The museum, the bacteriology section and biochemistry at K.E.M.H. lost technicians of experience who could only be replaced by temporary technicians of less experience. Bacteriology, haematology, pathology and serology are all short of senior trained technical staff to form the basis of efficient working and training sections.

Laboratory Accommodation.—The work of reconditioning two additional rooms as an instrument room and wash-up room for the biochemistry section was completed with the general reconditioning of the department and a new storeroom was built.

The partitioning and reconstruction of the main clinical laboratory was completed giving urgently needed increased bench space of limited extent.

No action was taken on the subdivision of the office, further improvements in the museum and suggested alterations and additions to the K.E.M.H. laboratories.

The re-panning of the new biochemistry section to be built in the 4th floor of the south-west wing was completed.

New Laboratory Equipment.—A Hilger spectrophotometer was installed in the instrument room of the biochemistry section. The flame-photometer attachment had not arrived at the end of the year. An Edwards centrifugal freeze-dryer of small size for preserving sera and cultures in vacuo was obtained. Ionic decalcification apparatus was installed in the main and dental hospital pathology sections. A spectrometer was provided for the K.E.M.H. laboratory and a Van Slyke gas analysis apparatus for the biochemistry section. Two additional incubators were installed in the tuberculosis laboratory.

A Casella Slit Sampler for estimating the bacterial content of the air in buildings was obtained for the bacteriology section and a Haden Hausser Erythrocytometer and a Marble Blood Counter were added to the haematology section. Owing to financial restrictions the ordering of several pieces of special apparatus was postponed to the next financial year.

Animal House Accommodation.—No steps to relieve the congestion by the provision of more space for the main animal houses have been taken. Essential work is still severely restricted, and investigational work cannot be undertaken. The supply of guinea-pigs has been erratic and scarcely sufficient for the limited use to which it is put. Rabbit and mouse supplies have improved. The supply of toads flown from Queensland has been sufficient for our limited needs. Supplies are now housed for convenience in the main animal house. The use of toads for general pregnancy testing economises space and toads are easier to maintain than rabbits and batches of mice.

As in previous years the largest part of the animal house used for inoculated animals is used for tuberculosis work to the exclusion of other equally important work.

The animal house laboratory assistant is now helped by two part-time cadet trainees undergoing instruction in animal care, maintenance and observation. The standard of hygiene in the animal houses has been improved, but still does not reach modern accepted standards of hygiene in an animal house maintained in a hospital building. An additional animal house attendant is required to reach this standard.

Sites have been explored and a provisional site has been chosen for the animal breeding station.

The Medical Laboratory Service of Western Australia.—The only laboratory built and completed during the year was a single room laboratory at the new Pinjarra hospital.

Supplies of glassware for specimen containers became available in larger quantities during the year. Sterile glassware in the form of blood tubes, plain and oxalated, urine bottles and swab outfits and biopsy jars containing fixative were issued to the extent of 545 dozen to all hospitals including Royal Perth Hospital. Postal containers are now provided for the outside issues resulting in an improvement in the condition of specimens received. A proportion of badly packed and broken specimens still arrive from practitioners not using the department's containers, and a few specimens disappear entirely in transit.

Express delivery of specimens from the G.P.O. and a frequent collection system from all air-line offices cuts out many delays. But specimens are still forwarded from some hospitals by the correspondence despatch service, which is not timed as an express package service. All specimens are "urgent" and should be forwarded by the most rapid method available whether it is by air line, train, mail bus or private car.

Serological investigations and other special work are still carried out for hospitals outside this laboratory service, such as the Princess Margaret Hospital and Fremantle Hospital, and interchange of technical staff with Princess Margaret Hospital has been arranged to further the training of staff from the latter hospital.

Visits were made to the hospitals at Northam, York and Pinjarra to discuss improvements of laboratory services and to inspect sites at the Northam hospital for the provision of a clinical laboratory.

Contact with other Medical Laboratories.—The importance of frequent contacts of senior personnel with other workers in similar fields has been previously stressed. The complete isolation of the Public Health laboratory staff makes some form of annual contact essential as a minimum requirement. In some laboratories study tours of six months after each three year period are now arranged to maintain progress and efficiency at the highest level.

The chief technical assistant, Mr. A. Drummond, spent a valuable six weeks working in a series of laboratories in all State capital cities in the East. The experience acquired and the contacts made have been of great benefit to the department and the scheme was commented on favourably by all heads of laboratories which were visited by Mr. Drummond.

The Director made a short tour of 11 days covering laboratories in all state capitals to investigate some specific administrative and technical problems. In all these older and well established laboratories the relatively high proportion of medically qualified staff and senior technical and office staff to total staff was noted. Whereas in English laboratories there is an average of two members of the technical staff to each qualified pathologist, most Australian laboratories seem to be organised with a proportion of approximately three or four to one. In these Public Health Laboratories the proportion is over 10 to one which prevents that constant close co-operation between technician and pathologist which produces the best work in a laboratory.

Junior Medical Staff.—The previous arrangement of part time pathology residents was continued throughout the year with its obvious defects. It was arranged that in 1953 the R.P.H. should appoint two pathology residents who should be attached to the Public Health Laboratory for whole time duties. Two suitable candidates were appointed to commence duty in 1953. These pathology residents will receive training in each section of the laboratory for a period of a year and will qualify for later appointment as pathology registrars, whose duties apart from routine and investigational work would include the correlation of clinical and laboratory examinations and instruction of residents and junior staff. From these pathology registrars it should be possible to obtain the assistant clinical pathologists and clinical pathologists for the future laboratories of Western Australia and some staff for the laboratories of the future medical school.

General Routine Examinations.—The attached table shows an annual total of 145,924 examinations in the Royal Perth Hospital and branch laboratories. This is an increase of 19 per cent. on the figure for 1951, but owing to the greater complexity and detailed elaboration of the work carried out this percentage increase should be multiplied several times to produce a true indication of increase. Of the 123,591 examinations carried out in the main laboratories of the Royal Perth Hospital, 73,805 were carried out in the pathology and bacteriology sections for Royal Perth Hospital cases against 33,980 for the Public Health Department, a proportion of 68·5 per cent. to 31·5 per cent. These show increases over the 1951 figures of 23·0 per cent. for Royal Perth Hospital examinations and 30·0 per cent. for Public Health Department examinations. The figure for the biochemistry section of 15,806 examinations shows an increase of 6·6 per cent. 91·1 per cent. of these examinations were for Royal Perth Hospital patients.

Three hundred and fifty-three post mortem examinations were carried out by the pathologist, Dr. T. R. Lubbe, compared with 276 in 1951. Ten thousand five hundred and forty-six sections, frozen, paraffin and special, were cut in the laboratories of the Royal Perth Hospital and Dental Hospitals. Six thousand three hundred and sixteen sera were examined for the Wassermann Reaction, 8,389 for the Kahn Test, 2,620 for various agglutination reactions. Two thousand and fifty-nine Coombs tests, direct and indirect, were performed. Forty-nine thousand three hundred and sixty examinations were carried out in hæmatology laboratories, one quarter of these being done in the King Edward Memorial Hospital laboratory. Seven thousand one hundred and fifty examinations were made in the tuberculosis laboratory. One hundred and seventy-two smears were examined for Myco. leprae, 913 for N. gonorrhæe and 2,404 swabs for C. diphtheriae. One thousand seven hundred and eighty-four samples of water, 31 samples of milk and 168 samples of air were examined for bacterial content. Forty-eight medico-legal examinations were carried out for the police department.

ROUTINE EXAMINATIONS, 1952.

Laboratories.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total, 1952.	Total, 1951.	In- crease per cent in 1952.
Royal Perth Hospital (Pathological and Bacteriological)	4,598	5,242	6,576	5,722	6,974	5,917	6,077	6,177	6,592	6,967	6,750	6,213	73,805	59,708	23·6
Public Health (Patho- logical and Bacterio- logical)	2,615	2,840	2,900	2,557	2,548	2,830	2,851	3,101	3,013	2,974	2,990	2,761	33,980	28,237	20·6
Biochemistry	1,222	1,386	1,501	1,294	1,339	1,207	1,411	1,343	1,334	1,337	1,316	1,116	15,808	14,737	6·6
K.E.M.H.	1,826	1,611	1,522	1,616	1,603	1,742	1,622	1,535	1,149	1,509	1,706	1,639	19,080	18,780	1·6
Dental Hospital	245	196	248	381	280	316	438	368	256	283	177	65	3,253	Too short a time in 1951	
Total	10,506	11,275	12,747	11,570	12,744	12,012	12,399	12,524	12,344	13,070	12,939	11,794	145,926	122,474	19·0

Pathology.—Dr. T. R. Lubbe reports a marked increase in the work handled by his section despite the difficulty of filling the vacancies in his staff by permanent trained technicians. Of the routine histological examinations the percentage of Public Health Department work has varied only slightly from that of 1951, 26·5 per cent. compared with 24·8 per cent.

There has been a noticeable improvement in the interest taken by the Royal Perth Hospital staff in the detailed histo-pathology of specimens from their cases and follow up clinics have been of value to the pathologist and the clinician alike.

This section owing to shortage of space and staff and increase of work has confined itself almost entirely to routine work and the provision of material for demonstrations. A study of the incidence of arteriosclerosis by age groups of patients examined post-mortem showed a generally similar incidence to that seen in the 1951 figures, the main exceptions being an earlier appearance of mild arteriosclerotic changes in the 25–30 year age groups and rather less severe forms in the upper age groups from 75 to 90 years.

A preliminary survey of the findings at post-mortem examinations of 338 cadavers and a comparison of the clinical diagnoses with these, as far as notes were available, showed that in 66·8 per cent. of cases the original diagnosis was fully confirmed and in 19·9 per cent. the post-mortem findings differed entirely from the clinical diagnosis.

An overall survey of this kind without more detailed analysis has obvious defects. The initial clinical diagnosis is sometimes only mentioned. The assessment of partial confirmation is difficult when multiple lesions cause death. But over a period of years the comparative figures of such surveys have a definite value apart from all the variables in the assessment of the accuracy of clinical diagnosis and the use of post-mortem confirmation or correction.

Some improvement has been made in the bacteriological investigations of post-mortem material, but this still requires further development to increase the accuracy of post-mortem diagnosis.

Museum.—Considerable development has taken place in the museum with the improvement of stands, the installation of fluorescent lighting and the provision of wall panelling for the illustration of blood diseases, protozoa, etc.

At the end of the year the museum contained 358 mounted specimens, and a further 461 treated specimens remained in the tanks awaiting sorting and mounting. Ninety-two new specimens were mounted and 78 old specimens were re-mounted. All new mounting was done in Perspex jars made in the museum, and numerous trays, racks and various equipment for other sections of the laboratories were made from Perspex in the museum preparation room.

The extracting and completion of notes on specimens both clinical and pathological made slower progress owing to shortage of qualified staff, but section material of all new specimens was prepared and cut ready for reporting.

Photographic work included specimen photographs, chart copying, photostat copying, enlargements, photomicrography, the preparation of lantern slides and clinical photography.

The museum preparation room was also used for much minor repair work for the laboratories in the absence of a laboratory workshop.

For the more rapid development of the museum to reach eventually the requirements of a future medical school an assistant pathologist is required.

Bacteriology.—Under the direction of Dr. N. Kovacs, considerable progress has been made in the training of staff, the collection of specimens and the more exact isolation and differentiation of bacteria causing infections, despite the cramped working conditions of this section.

Dr. Kovacs reports on the work of this section :—

The diagnosis of the *Salmonellae* has shown a definite improvement. The enrichment media, especially the selenite broth, proved in our laboratories superior to the direct plating of the faecal specimens. Among the solid media, the desoxycholate plates gave a much higher yield than the McConkey medium in the detection of intestinal pathogens. We still use the McConkey medium for the faecal pathogens as in a very few cases we find *Salmonellae* or *Shigella* colonies on this medium where the desoxycholate plate proved negative. On the other hand the McConkey medium was very useful in the detection and differentiation of the bacteria from the urines, where the desoxycholate medium would be too selective. We received agglutinating sera from the Medical Research Council in London and with them were able to type our strains of *Salmonellae*. Most of the *Salmonellae* strains cultivated were of the food-poisoning group, *S. typhi* murium and *S. cholera* suis. Several *Shigella* strains were also cultivated, the majority being *Shigella sonnei*.

All *Proteus* strains from the urines were classified and a probable new type of *Proteus* strain was isolated. A new method of quick diagnosis of *Ps. pyocyanea* is under investigation which will enable us to give a presumptive diagnosis of these strains direct from the plates.

To avoid contamination of the urine specimen during catheterisation of female patients, we suggested the use of short rubber catheters (instead of the awkward long catheters). The peripheral end of the catheter is enclosed in a small glass test tube which can be held in the hand while taking the specimens without risk of contaminating the specimen. The covering test tubes complete with catheters are autoclaved in individual

glass tubes. These catheters combined with our recently introduced urine bottles, closed with aluminium caps instead of cotton stoppers, will reduce the number of contaminated specimens which were previously very disturbing.

Advice was given to the operation theatres regarding autoclaving—especially about the sterilising of rubber gloves. Experiments were done with starch glove powder and a simple sterile container was devised for storing the powder ready for use by the surgeon.

The swab specimens sent in test tubes with cotton wool stoppers were often received too dry for use, particularly those received from the country as well as some received from the Infectious Diseases Branch. We, therefore, replaced cotton stoppers by cork stoppers.

The positive results of diphtheria examinations have shown a marked increase. This was partly owing to the introduction of tellurite media as a routine as well as to a more elaborate general technique and improved swabbing methods. Experiments are in progress to further improve our methods, mainly with different types of tellurite plates. For the carbo-hydrate fermentation the Frobisher infusion broth media were introduced and they are now used parallel with the Hiss media. In collaboration with Dr. Thorburn we laid down suggestions for the taking of diphtheria swabs and we asked for more detailed case histories for diphtheria cases so as to enable us to find out which of the cases had already been treated with penicillin or anti-diphtheria serum. Further experiments are in progress to compare the results of the Loeffler culture inoculated in the Infectious Diseases Branch with the results of swabs taken from the same patients where a parallel inoculation is made in the laboratory and the tellurite plate is also used.

We were able to cultivate and study *Entamoeba histolytica* on the Dobell-Laidlaw medium.

There were certain difficulties in the general preparation of media, mainly in the pH adjustment. This was corrected by using a pH electrometer. In the carbohydrate-peptone water media we are using bromthymolblue indicator, instead of the Andrade indicator. This also gives us an indication of the pH of the uninoculated media. For the Hiss media we introduced double indicators; a mixture of bromthymolblue and Andrade. An improved medium for H_2S production was made and proved to be very useful in the differentiation of the Enterobacteriaceae.

Because of technical reasons we could not finish our experiments on the influence of tellurite and air (probably oxygen) on the growth of *Myco. tuberculosis* which we started in 1951.

To study the causes of so-called "false positive" or non-specific reactions in the serological tests for syphilis, doctors were asked to send in blood for repeat tests in all positive cases where a difference between the intensity of Wassermann and Kahn tests was seen and where no signs nor history of a specific infection were present. With these further tests we were able to exclude most of the "false positive" cases and thus saved the patients from receiving erroneous diagnosis and unnecessary treatment. The statistical evaluation of these cases will follow when sufficient data has been collected.

We began work on the solution of the aetiology of the pneumonias in Western Australia. So far we have only found pneumococci or other bacteria known to cause pneumonia in a very small percentage of these cases. At the same time none of the examined cases produced positive cold agglutinins and therefore we found no indication of a viral aetiology. The M.G. Streptococci agglutination test has not so been used.

During the year many problems of great practical interest cropped up, some of them were mentioned above. Considerable progress has been achieved in solving these. Several new methods were introduced in our laboratory and are now used in our standard technique with very satisfactory results. On the other hand, many methods which we found unsatisfactory were changed and replaced, after careful controls, by newer ones. Several of our methods and experiences will be the subject of publication. Unfortunately the shortage of experienced staff and increased routine work—including the teaching of the staff—prevented us from completing the material for publication. We hope that with the increase in staff which is planned, we shall be able to exchange our experiences with other laboratories.

The desired co-operation between the Royal Perth Hospital and Laboratory improved considerably during the year and, in many instances, difficult cases were discussed with Honoraries and residents.

I would like to stress the fact that one of the major difficulties in our work is the shortage of staff, particularly experienced staff capable of coping with the normal routine.

Bacteriology-Tuberculosis.—The total number of examinations made in the tuberculosis laboratory was 7,150, an increase of eight per cent. compared with the 1951 figure. The examinations for the Department of Public Health increased from 2,729 to 3,657 (51.2 per cent. of the total) and those for the Royal Perth Hospital decreased from 3,874 to 3,493 (48.8 per cent. of the total). The specimens consisted of sputa, gastric contents, urines, pleural, cerebro-spinal and other fluids, pus, tissues, etc. Three Hundred and thirteen cases showed tuberculosis infection, 205 from the Department of Public Health and 108 from the Royal Perth Hospital. 14.5 per cent. of sputa and 31.3 per cent. of gastric contents showed the presence of acid and alcohol-fast bacilli morphologically resembling *Myco. tuberculosis*. No detailed analysis of the acid and alcohol-fast bacilli in sputa and gastric contents was possible owing to lack of space and staff.

The mere presence of acid and alcohol-fast bacilli in smear preparations does not indicate a positive diagnosis of tuberculosis. Only when culture and pathogenicity tests have been carried out can a definite bacteriological diagnosis be made. Where the history was suggestive all specimens were cultured and guinea-pigs inoculated, but these examinations cannot be carried out as a routine on every specimen at present.

Those specimens examined both by culture and guinea-pig inoculation showed most conclusively the value of the combination of both examinations and the defects of the use of one of these examinations to the exclusion of the other. 57·9 per cent. of the examinations showed positive cultures and positive guinea-pig inoculations, 27·3 per cent. gave negative cultures with positive guinea-pig inoculations and 14·8 per cent. gave positive cultures and negative guinea-pig inoculations.

Serology.—Apart from the daily Kahn tests and agglutination tests and the weekly batch of Wassermann tests, routine pregnancy testing and medico-legal investigations are carried out in this section. Improvements have been made in the preparation of antigens and agglutinable suspensions and the “cell-stroma” method of preparing amboceptor for sheep’s red cells has been introduced successfully. Agglutination tests for brucellosis modified by the use of antihuman globulin serum (Coombs technique) have improved the sensitivity of this reaction and eliminated the prozone phenomenon.

The technical assistant in charge of this section also deals with the supply and maintenance of equipment and stores which takes up much of his time. A workshop and a mechanic to carry out the repairs done in this section and in the museum preparation room are rapidly becoming necessary. Workshops belonging to the Department of Public Health, X-Ray section, the Royal Perth Hospital and Public Works Department carry out some major repairs efficiently but slowly.

Medico-legal Investigations.—These are time-consuming both in the laboratory and in the associated attendances in police and Supreme Courts. The work is very spasmodic and only absolutely essential investigations are submitted by the police department. A separate medico-legal laboratory with an attending forensic pathologist is now required so that advances in this branch of investigation can be made and the police be given opportunities for the full investigation of every case.

Haematology.—Out of a total of 49,360 examinations carried out in all sectional haematology laboratories 12,139 were done at the King Edward Memorial Hospital laboratory. The total figure of 49,360 shows an increase of 16·3 per cent. over the 1951 figure.

Dr. Kovacs reports :—

To avoid variations in the results of the haematological examinations detailed regulations were laid down of the methods used in the laboratory for the perusal of the staff whenever needed. Experience showed that there is an unintentional tendency by the staff to change the methods, even only slightly, which in consequence may lead to considerable errors. The introduction of the Pappenheim method of coloration of the blood films gave us most satisfactory results and facilitated the differential diagnosis of the leukaemias, the number of which increased. In the platelet counts, as the results seemed to be very erratic, at the end of the year we changed the method of counting, using the Lempert-Kristenson method in the counting chamber (instead of the Fonio method). The counting chamber method gives higher platelet values than the slide method used previously and the clinician has to take this into consideration. The difficulty in counting platelets is to distinguish them from extraneous particles and a certain amount of experience is necessary in counting. At present experiments are in progress to enable us to count the platelets in an optically clear fluid, as according to our experience the Lempert-Kristenson fluid very often shows interfering particles. There was an increased demand for eosinophil counts in connection with cortisone treatment. Different methods of direct counting in the counting-chamber were tried and the eosin-saponin-formalin method was found the most satisfactory. The Westergren method of E. S. R. was simplified. The blood was measured and mixed with the citrate fluid in the syringe itself, a method in use in many institutes. The measurement of the red cell diameter with the diffraction method (Baden-Hausser apparatus) was introduced in our technique. It will facilitate the measurement of the mean cell volume for the classification of anaemias.

The technique of examination of L. E. cells was introduced. We were, however, unable to find positive specimens in our limited material.

A number of cases of infectious mononucleosis were investigated. The haematology and the Paul Bunnell test of all cases were observed conjointly. In all cases big monocytic cells with vacuolation in the cytoplasm were found. For the better evaluation of the Paul Bunnell test, besides the absorption test with guinea-pig kidney, the absorption test with ox cells was introduced so as to exclude the naturally occurring antibodies.

The reorganisation of blood grouping by means of double checking all readings, rigorous recording of the results and by use of positive and negative controls, reduced the errors to a minimum. The introduction of the retesting of all Rh negative bloods with a different batch of serum was most helpful. It appeared that most of the “false reactions” were “false negative” bloods showing only light agglutination overlooked at the first examination. These apparently negative bloods have always shown agglutination during the control with the second serum and were immediately retested with two different batches of Rh serum for confirmation. During the year errors were reduced to a minimum and these were mainly caused by the mixing up of request forms and labels.

The work of the “blood coagulation” section was most successful. Although we suffer from variations in the thromboplastin used and the consequent variation of the normal prothrombin time, our examinations of the prothrombin time were most helpful in the treatment of the thrombo-embolic diseases. The prothrombin results were as a rule communicated to the wards before noon to enable the physicians to prescribe the daily doses of the anticoagulant during the afternoon rounds. The early reporting was imperative as we found that the big variations in the prothrombin times were partly due to the fact that in many cases the anticoagulants were only given once a day, mainly in the late afternoon.

During the year intramuscular heparin administration was introduced in the Royal Perth Hospital. On our suggestion systematic examinations were done on the different types of intramuscular heparin preparations, on the resorption time and on the duration of their activity. The most important result of our work was the experience that there is very big individual variation in the reaction of the patients to heparin. Although the danger of haemorrhage due to heparin is definitely less than with the different coumarol compounds, the coagulation time of all patients must be repeatedly tested to find out the resistant cases, in which either the heparin doses or the mode of administration should be changed or another type of anticoagulant should be used. In short, uncontrolled heparin administration gives in many cases an unfounded security in the therapy and prophylaxis of the thrombo-embolic diseases.

During the year the plasma coagulation time, as well as the estimation of the prothrombin consumption time, was introduced.

One great difficulty in our work on blood coagulation was that in many cases we could not get from the wards the exact doses of the anticoagulants given or the time of their administration. On several occasions the anticoagulant doses entered on the request forms were incorrect and in some cases they had not been given at all to the patients. These facts explained variations in the prothrombin time which could not be correlated to the data communicated to us. We are now, where possible, checking the head-sheets of the patients when blood taking. But this involves much loss of time which, with our more than limited staff, we can ill afford. Again, another difficulty with which the haematology section have to contend is the late arrival of many requests for laboratory examinations when the staff have already begun collecting the specimens, and thus they are forced to do their rounds of the wards again.

The exactness of work in the haematological section leaves much to be desired and many of our subsequent reports show a high variation which can not be explained by the course of the disease itself. This is partly due to the paucity of senior highly trained staff and the necessity of using for much of the simpler work staff lacking in the experience and technical capacity of fully trained experienced personnel. Conditions of overcrowding and over-working are also partly responsible.

Biochemistry.—With the return of Miss L. M. Silvester and the appointment of a typist this section showed renewed activity. Some of the routine methods for estimation of plasma proteins, insulin sensitivity and serum amylase were revised and the determination of urinary 17-ketosteroids was developed on a routine basis. The glassware for a manometric Van Slyke apparatus and the perspex frame of a micro-electrophoresis apparatus were constructed at the end of the year and are now awaiting completion.

The Uvispek spectrophotometer was used for urinary coproporphyrin determination in collaboration with Dr. W. S. Davidson in the study of lead absorption in factory workers.

The Clinical Research Unit in the latter part of the year began to develop work in collaboration with this Section. The increased pressure of work from it will necessitate further staff increases as its work develops.

The King Edward Memorial Hospital Laboratory.—The work of this branch laboratory shows steady progress and its functions as a Rh reference laboratory are becoming more widely known and appreciated by medical practitioners all over Western Australia. Although still far from providing a complete Rh service to every expectant mother, which is beyond the capacity of the trained staff and laboratory space available, the “private cases” investigated have shown an increase of 43·3 per cent. to a total of 1,984. This increase has been offset to some extent by a decrease of “clinic cases” to 2,315.

The staff was increased by the appointment of a biochemistry technician and a typist. The biochemistry section was largely concerned with the development of routine techniques and an investigation into the cholesterol content of mothers and infants bloods in the Rh positive and Rh negative cases as a preliminary step to a study of inhibitory factors in the blood of the newborn child.

The bacteriology section showed progress in the investigation of infections of both mothers and infants and routine nasal and throat swabbing of nurses and aides was instituted late in the year to trace the possible origin of hospital infections.

In addition to routine serology examinations direct Coombes testing of the cord blood of all infants was commenced and in the first 200 samples Dr. J. Watson reports the finding that four were suffering from previously unsuspected sensitisation to the AB and Rh systems.

By the use of a method of elution of antibodies from Rh sensitised red blood cells a clearer definition of the difference between maternal and infant antibody titres has resulted in a more accurate assessment of the severity of the haemolytic process in the infant.

The laboratory provides reference facilities in connection with blood grouping and Rh testing in connection with the hospital blood bank, which is maintained in the laboratory.

Dr. G. A. Kelsall submits the following report on “Cases of Haemolytic Disease of the Newborn since August, 1951” :—

Since August, 1951, there have been a total of 108 mothers handled by us in whom abnormal antibodies have been detected. From these 108 pregnancies 111 infants were born there being three twin pregnancies. Eleven of these infants were compatible with the mother (being themselves also Rh negative) and therefore requiring no treatment.

There were therefore 100 incompatible infants. But of these, 11 were stillborn so that there were 89 incompatible live births. Twelve infants of these 89 were so mildly affected with haemolytic disease as to require no treatment, while five were moribund at delivery and died before transfusion therapy could be instituted.

The remaining 72 incompatible live born infants were treated by exchange transfusion and of these, five died subsequently.

From 100 incompatible pregnancies there have been 79 surviving infants, or a total wastage, including stillbirths of 21 or 21 per cent. this being made up of 11 per cent. stillbirths and 10 per cent. live born infants which subsequently died.

It is not possible to arrive at a figure for the incidence of haemolytic disease of the newborn because private cases were selected for investigation by the referring doctor, not as a routine, but often because of some suspicious family or other history either before or after delivery, *e.g.*, the appearance of jaundice.

Similarly if we examined the incidence of the hospital cases only it is found that many women have been referred to the clinic and have become hospital patients for the same reason. The error therefore is weighted in favour of a higher incidence of the disease than is actually the case.

NO EXCHANGE TRANSFUSION GIVEN TO 17 Rh POSITIVE INFANTS.

Titre Difference from Maternal and Cord Blood at Delivery.

5 Died (Moribund at birth).						12 Alive.					
No.					Titre Difference.	No.					Titre Difference.
1	....	....	....	....	2,016	1	....	....	....	....	4
2	....	....	....	....	248	2	....	....	....	....	56
3	....	....	....	....	496	3	....	....	....	....	3
4	....	....	....	....	992	4	....	....	....	....	30
5	....	....	....	....	384	5	....	....	....	....	6
Average Titre Difference=					827	6	....	....	....	....	8
						7	....	....	....	....	24
						8	....	....	....	....	12
						9	....	....	....	....	60
						10	....	....	....	....	6
						11	....	....	....	....	14
						12	....	....	....	....	504
						Average Titre Difference =					* 18

The proposed alterations and additions to the laboratories which are so essential to the progress of this laboratory were not carried out by the end of the year.

The increasing work of the King Edward Memorial Hospital laboratory and its progress has been made possible only by the keenness and overtime work of the acting technician Mr. G. H. Vos, who has made himself available at nights, weekends and holidays to maintain the continuity of serial investigations.

Publications.—(1) G. A. Kelsall and G. H. Vos.—“The antibody titre in maternal and infant’s serum as an indication for treatment in haemolytic disease of the newborn.” *Medical Journal of Australia*, 15th March, 1952.

(2) J. Watson and G. H. Vos.—“A study of maternal Rh agglutinin titres in pregnancy.” *Medical Journal of Australia*, 6th September, 1952.

Perth Dental Hospital Laboratory.—This laboratory has become a branch laboratory providing laboratory services to the Perth Dental Hospital and the Dental School of the University. During the year bacteriological and haematological work was gradually developing in addition to histo-pathology, which in its routine and investigational spheres occupied most of the time of the technician. The early work in bacteriology consisted of the routine diagnosis of smears from suspected Vincent’s angina cases. Root canal cultures were done to estimate the usefulness of various treatments with antibiotics.

Apart from the routine biopsy material and the preparation of routine section material for the teaching of dental students, the bulk of the histological work consisted of frozen sections stained by metallic impregnation methods for the study of the innervation of structures in the mouth, tooth buds, mucosa, tooth pulp, etc., and the comparison of these with the innervation of dermal and epidermal structures.

Nerves have been shown to be present in the dental papillae of an eight weeks old foetus, 16 weeks before the reputed time of their origin. The innervation of the periodontal membrane has been investigated and its similarity to that of hair and whisker follicles has been demonstrated. The concentric winding of nerve fibres round all these structures suggests that their high degree of sensitivity is produced by some form of amplification of impulses produced by this arrangement.

Investigations continued relating to the structure and function of Langerhans dendritic cells of the epidermis. They were demonstrated in the human foetus and in albino animals as well as in normal human skin, which excludes any association with pigmentation. They are unaffected by acute inflammatory conditions. The possibility of their possessing secretory function in connection with neural mechanisms is being further explored. The preliminary work on this subject has been written up for publication by Mr. T. E. Dockrill.

Professor H. G. Radden left the Perth Dental Hospital to take up an appointment in the University of Manchester. He took away with him details of special techniques used in this laboratory for comparison in the laboratories of his new dental school and Oxford. Work is now going on to perfect certain techniques with the evaluation of several different fixatives and to produce a histo-chemical analysis of cell granule structure.

Staff Changes.—The following appointments and resignations have occurred :—

Appointments—

- Miss Hedges, Technician (Biochemistry), 2nd January, 1952.
- Mr. G. Moran, Cadet, 21st January, 1952.
- Mrs. L. S. Kellett, Senior Typist, 20th February, 1952.
- Miss M. C. Pike, Typist, 29th February, 1952.
- Miss N. Cousins, Typist, 31st March, 1952.
- Miss S. M. Sangster, Technician (Haematology), 22nd April, 1952.
- Miss D. M. Hutchins, Typist, 8th May, 1952.
- Mrs. Harkness, Cleaner, 12th May, 1952.
- Mrs. C. Milne, Cleaner, 14th May, 1952.
- Miss N. Murphy, Laboratory Assistant, 26th May, 1952.
- Mrs. J. Atkinson, Cleaner, 30th June, 1952.
- Miss W. Lynch, Technician (Biochemistry), 7th July, 1952.
- Miss M. McAleer, Technician (Bacteriology), 14th July, 1952.
- Mr. H. T. Dagnia, Cadet, 15th July, 1952.
- Miss S. Summers-Jenkins, Office Assistant, 25th August, 1952.
- Miss W. E. Stronach, Typist, 25th August, 1952.
- Mrs. D. Carr, Cleaner, 6th October, 1952.
- Miss M. L. Stone, Temporary Technician (Haematology), 1st December, 1952.
- Miss K. J. L. Thieberg, Temporary Technician (Haematology), 1st December, 1952.
- Miss P. Sloan, Temporary Laboratory Assistant, 25th November, 1952.
- Miss P. Faulkner, Temporary Laboratory Assistant, 1st December, 1952.
- Miss R. McAleer, Temporary Technician (Bacteriology), 5th December, 1952.

Resignations—

Mr. P. S. Finch, Temporary Laboratory Assistant, 18th January, 1952.
 Miss J. E. Day, Technician (Haematology), 18th February, 1952.
 Mrs. J. W. Spaul, Senior Typist, 22nd February, 1952.
 Miss P. Sloan, Temporary Laboratory Assistant, 29th February, 1952.
 Miss B. Stewart, Typist, 29th February, 1952.
 Miss L. W. Byass, Temporary Laboratory Assistant, 21st March, 1952.
 Miss J. Holmsen, Typist, 28th March, 1952.
 Miss P. Faulkner, Temporary Laboratory Assistant, 28th March, 1952.
 Mr. E. Carroll, Technician (Bacteriology), 10th April, 1952.
 Mr. G. Moran, Cadet, 2nd May, 1952.
 Miss N. Cousins, Typist, 9th May, 1952.
 Miss A. L. Telfer, Laboratory Assistant (Haematology), 30th May, 1952.
 Mr. J. S. Stewart, Technician (Biochemistry), 30th May, 1952.
 Mr. K. Iles, Technician (Museum), 29th October, 1952.

Exchanges—

Miss C. Middleton, transferred to Princess Margaret Hospital, in place of Miss V. Robertson, to Public Health Laboratories for extra training, 8th September, 1952, for six months.

Acknowledgments.—I wish to express my appreciation of the work done by the staff under difficult conditions and particularly that of my senior technical assistant, Mr. A. Drummond, whose work as senior staff officer has helped so considerably in the running of the laboratories.

I desire also to place on record my appreciation of the advice and help of the Commissioner of Public Health, the Under Secretary, the Assistant Under Secretaries and other members of the Staff of the Public Health Department in all the problems I have put up to them.

(Sgd.) W. A. YOUNG,
 B.Sc., M.B., B.S., M.R.C.S., L.R.C.P., D.T.M. & H.,
 Director of Medical Laboratories,
 Western Australia.

APPENDIX II.

REPORT FROM THE DIRECTOR, TUBERCULOSIS CONTROL BRANCH.

To the Commissioner of Public Health.

Sir, I have the honour to submit a report on the activities of the Tuberculosis Control Branch for the year ended 31st December, 1952.

There has been no major change in the activities of the Branch and it is still possible to allow of comparison and present this Report in the form first commenced in my Report of 1950 : that is :—

Prevention.
Case finding.
Medical care and isolation.
Social and economic protection.
After-care and rehabilitation.
Records and statistics.

PREVENTION.

All possible steps are taken to prevent transmission of tuberculous disease from those sufferers in an infectious state by isolating them in hospital whenever possible, and closely supervising them in their homes when no beds are available.

The metropolitan area is zoned and the nine Visiting Nurses, according to their other other duties, each keep from 100 to 200 out-patients under supervision ; each group includes from 10 to 15 potentially infectious, positive sputum patients.

Every effort is made to improve housing and living conditions where necessary, particularly after discharge from hospital. In liaison with the State Housing Commission, help was arranged for 41 ex-patients, the accommodation provided including State Rental Homes, flats, eviction houses and War Service Homes.

B.C.G. Vaccination.

As reported by the Tuberculosis Physician, the total number of Mantoux tests and B.C.G. vaccinations performed in the metropolitan area during the year was approximately the same as during 1951. However, a commencement was made in vaccinating negative Mantoux reactors in the school leaving age group in country centres in association with mass X-Ray surveys.

The extension of the procedure to the National Service Trainees, with the co-operation of the Service authorities, was balanced by the fact that the coverage of boys in the school leaving age group in the metropolitan area was discontinued.

It is interesting to note that, although the vaccination was offered to the National Service Trainees on a voluntary basis, 98 per cent. of the eligible negative Mantoux reactors accepted it.

“Morrison.”

“Morrison” preventorium continued its function for the reception of new-born babies of tuberculous parents.

Forty-seven babies were admitted during the year and were vaccinated at the average age of 7 to 10 days. The average daily rate was 10 to 12, the highest number at any one time being 16.

Action under Section 293 of the Health Act.

During the year, four persons suffering from pulmonary tuberculosis in an infectious state were “directed to enter Wooroloo Sanatorium for treatment.” Twenty-eight persons were required to submit to X-Ray examination of the chest for tuberculosis.”

Police court proceedings were taken against one man, who did not report for examination and he was fined £2, with £3 7s. costs at Fremantle on 19th August, 1952.

The value of this action was shown by the fact that this individual subsequently reported for an X-Ray of the chest which showed extensive disease in an infectious state and he then voluntarily entered the Sanatorium for treatment. /

Legislation.

Section 293A of the Health Act.

Your notice published in the *Government Gazette* on 24th April, 1952, required those persons who have been under close personal contact with a person known to be or to have been suffering from tuberculosis, who have received notice to that effect from the Director of Tuberculosis Control, to undergo X-Ray examination for tuberculosis within one month of notice to do so from the Director of Tuberculosis Control.

Your gazettal on the 23rd May, 1952, requiring assisted migrants to undergo X-Ray examination for tuberculosis after arrival in Western Australia from overseas, completed a gap left in previous notices so that it is now obligatory for all new arrivals to be X-Rayed.

CASE FINDING.

Whereas the policy of case finding of tuberculosis in priority groups was continued in the metropolitan area, a new development during the year was the commencement of compulsory X-Ray surveys in country centres.

Suspect patients referred to the Perth Chest Clinic by metropolitan practitioners.—The Tuberculosis Physician reports a 17 per cent. increase in the number referred to 7,888 ; of whom 100 were admitted to hospital suffering from pulmonary tuberculosis. This group, therefore, remains the most valuable one for case finding effort as this number represents 1·7 per cent. of those referred.

A paper prepared by the Tuberculosis Physician demonstrating the usefulness of this work since the Clinic opened in 1948 was published in the Medical Journal of Australia on 2nd August, 1952.

In view of the present interest in cancer of the lung, it is interesting to note that the diagnosis of this condition was confirmed in 26 patients, as against 14 during the previous year.

This would appear to be more than an apparent numerical increase, but the figures are too small to have any statistical significance.

The function of the Chest Clinic is to refer all non-tuberculous conditions either back to the private practitioner or to the Royal Perth Hospital. The Clinic physicians, however, play their part in the diagnosis and suggested management of the non-tuberculous chest diseases.

Hospital In-patient and Out-patient Group.

The value of routine X-Ray examination of all hospital in-patients and out-patients for the detection of patients suffering from pulmonary tuberculosis and for the protection from infection of the nursing staff was shown in a paper "Report on Pulmonary Tuberculosis in a General Hospital" by the Medical Superintendent of the Royal Perth Hospital, published in conjunction with the paper by the Tuberculosis Physician previously mentioned.

A mass radiography unit to extend the coverage of this group was installed at St. John of God Hospital, Subiaco, in April of the year and by the end of the year over 3,000 in-patients had been X-Rayed.

A unit was also installed at the Fremantle Hospital in April of the year, but, owing to certain administrative difficulties, only 750 in-patients were examined.

Contacts of Known Cases of Tuberculosis.

The value of X-Raying "contacts" was showing in my 1951 Report and, following the gazettal in May of this group for compulsory X-Ray examination, the number reporting for six monthly X-Ray almost doubled, and a total of 3,866 examinations were made during the year.

Country Practitioners.

Part-time tuberculosis officers continue to function at Albany, Bunbury, Collie, Geraldton, Kalgoorlie and Northam, *i.e.*, Dr. A. E. Vivian, Dr. W. Lawson Smith, Dr. A. F. Walsh, Dr. A. J. Beaumont, Dr. A. B. Webster and Dr. A. McL. Robinson, respectively. In addition, Dr. W. J. Grey of Merredin has also now been appointed in this capacity.

Careful attention has been paid to increasing the efficiency of X-Ray installations in country hospitals, where possible, and to imparting a satisfactory chest X-Ray technique, and films are now received regularly from a majority of the larger centres.

Two thousand six hundred and seventy-three films of suspect patients were received, an increase of 33 per cent. on the previous year. Twenty-five active cases of pulmonary tuberculosis were discovered ; a further 25 suspect cases are being kept under observation ; 9 patients with carcinoma of the lung were disclosed out of a total of 245 varied abnormalities.

Mass Radiography.

The number of exposures at the Chest Clinic increased by 17 per cent. to a total of some 36,000, of whom 14,000 were volunteers. In addition, 6,000 volunteers reported to a unit installed for a period of six months at the Fremantle Literary Institute.

The incidence of active pulmonary tuberculosis in this group is now slightly less than two active cases of pulmonary tuberculosis per 1,000. The drop in this figure is perhaps becoming to be statistically significant.

The original Mobile X-Ray Caravan (on lease from the Department of the Army) used during the year for supplementary surveys in the metropolitan area, became very broken up and is now being completely re-built.

Country Surveys.

The completion of the new Transportable X-Ray Van in June enabled the first country survey to be carried out.

During the months July to October, inclusive, approximately 12,500 persons between the ages of 16 and 75 were examined at Kalgoorlie, Boulder, Norseman and Coolgardie.

The survey was made compulsory under Section 293A of the Health Act.

An incidence of 4.2 new cases of active pulmonary tuberculosis or silico-tuberculosis per 1,000 x-rayed was disclosed ; a rate considerably higher than that of the Perth metropolitan area. As a result, 49 miners or ex-miners were admitted to Wooroloo Sanatorium.

The follow-up of this Goldfields survey has required the appointment of a visiting nurse at Kalgoorlie to assist the local tuberculosis officer.

It is hoped, by further effort by the Tuberculosis Control Branch in the next few years, that the risk of the super-added tuberculosis infection to miners already exposed to silica dust will be minimised.

Special Groups.

Migrants.—During the year 4,395 X-Ray films of assisted migrants were submitted for inspection by the Commonwealth Health Department.

With the co-operation of the latter Department and the Customs Department, pamphlets were distributed to new arrivals informing them (in six languages) of their obligation to report for X-Ray examination of the chest.

As a result, 1,176 reported either at a metropolitan clinic or a country hospital for examination. A total of 767 were examined specially at Graylands Camp by the Mobile Unit.

The year's work in the supervision of this special group resulted in the discovery of 11 tuberculosis sufferers ; 8 active and 3 inactive, and in addition, 2 cases of pleural effusion.

MEDICAL CARE AND ISOLATION.

A new development in treatment occurred during the year with the announcement in February in America of a new drug—Isoniazid—effective against tuberculosis.

Of simple chemical composition and easily manufactured, it was quickly available in Australia. By the end of the year it had taken its proper perspective in our armamentarium of antibiotics and drugs.

It has been found to be an extremely potent anti-tuberculosis agent ; but it must not be used solely, due to the rapid development of resistant tuberculosis organisms, and it does not replace other drugs or well-established measures. One must be emphatic that ambulatory or unsystematic treatment with Isoniazid alone must be discouraged.

However, used in combination with Streptomycin and/or Para-aminosalicylic Acid, it has increased the power of our attack against tuberculosis, and different combinations may be effective when others fail.

Discharges from the Wooroloo Sanatorium retain the satisfactory percentage of 80 per cent. Arrested or Inactive cases.

The discharge rate of active cases of 20 per cent. is still very high, and is due to pressure for beds ; however, an attempt is made to ensure that home conditions are not favourable to spread of infection before "positive" patients are discharged.

The figure for re-admissions during the year due to relapse of disease, 89 or 32 per cent., is most unsatisfactory. This again may be correlated with the pressure on beds, as this has been one of the factors responsible for the further reduction in the average patient stay in hospital to a much lower figure—males 41 weeks and females 37 weeks. This is further shown by the fact that 80 per cent. of the re-admissions were first re-admissions within one year of discharge.

Those undergoing surgery as well as antibiotic and drug treatment were less likely to relapse. This is a credit to the excellent judgment and work of the Surgical Team.

Summarising the present attitude to treatment : Bed rest still remains the basis of all treatment. Antibiotic and drug treatment is used for almost all patients. Surgery is being employed more often at the stage of maximum improvement, when complete arrest by conservative measures alone does not seem sure. The operation of a modified thoracoplasty with plombage still remains the major collapse procedure, a plastic sponge now being tried instead of leucite spheres, but resection of lungs, lobes or segments of lobes is being increasingly performed. Artificial pneumothorax still holds a place, but only when the type of case appears to offer the ideal indication for this method.

Royal Perth Hospital.

During the year the number of beds available for investigation and treatment of early cases of pulmonary tuberculosis progressively diminished.

At the end of the year only 6 female and 6 male beds were available. An average of 7 beds were available during the year for tuberculosis cases in the Thoracic Surgical Wing.

Apart from 74 patients transferred from the Wooroloo Sanatorium for surgery, 111 patients were admitted to the Hospital under the care of the Chest Clinic medical staff during the year. (This compares with 189 the previous year).

Of these patients, 5 underwent surgery, as follows :—

Modified thoracoplasty (apicolysis with plombage)	3
Lobectomy	2

A total of 47 of the patients were transferred to Wooroloo Sanatorium for further treatment.

While agreeing that the Medical Superintendent of the Royal Perth Hospital may have had no choice but to cut down the available beds for tuberculosis patients, this is regretted, as it is considered that the general hospital must play its part in the control of tuberculosis.

Repatriation General Hospital.

Fortunately, to counter-balance the drop in beds at the Royal Perth Hospital, an additional 3 female medical and surgical beds were made available for civilian patients at the Repatriation General Hospital, making a total of 17 beds available at the end of the year.

Twenty-nine civilian patients were treated at this Hospital during the year.

The co-operation of the Repatriation Authorities in making these beds available is much appreicated.

Out-Patient Treatment—Perth Chest Clinic.

Attendances at the Out-Patient Clinic remained on a par with 1951, but the number of patients receiving artificial pneumothorax dropped to less than half that of the previous year—the evolution of time showing its effect on the pneumothorax era.

The amount of bacteriological investigation carried out by the Public Health Medical Laboratories for the Chest Clinic during the year indicated a great increase in the work, partly due to general increase, partly due to the necessary investigation of patients as out-patients due to lack of in-patient beds at the Royal Perth Hospital.

Sputum examinations (for 430 individuals)	1,132
Positive results for m. tuberculosis (for 123 individuals)	205
Gastric contents (cultures and /or guinea pig inoculations) (on 155 individuals)	476
Positive results (cultures and /or guinea pig) (for 86 individuals)	172

Princess Margaret Hospital for Children.

The Chest Clinic functions once a week.

In-Patients.—There were seven admissions of proven pulmonary tuberculosis during the year. Most of these children were under the age of two years and were contacts discovered as a result of Mantoux testing.

Five other Mantoux positive contacts, without X-Ray evidence of lung involvement and under the age of two years, were admitted for prophylactic treatment with Streptomycin and P.A.S.

The year showed a rise in the number of non-pulmonary cases, as eight patients with tuberculous adenitis, four with tuberculous meningitis, and three with Potts' disease of the spine, were admitted during the year.

There were no deaths during the year.

Towards the end of the year a measure was adopted whereby parents of those children showing a positive Mantoux reaction during the routine application of this test at the Hospital, were circularised recommending that they have chest X-Ray examinations.

SOCIAL AND ECONOMIC PROTECTION OF SUFFERERS.

The Commonwealth scheme of Tuberculosis Allowances continues to be the mainstay which allows of the continuance of the control campaign.

In accord with the rise of the cost of living and basic wage rise, the rates were increased on 2nd October, to :—

	Weekly.
	£ s. d.
Married sufferer with dependent wife	9 0 0
Sufferer without dependents—	
(a) While hospitalised free of charge	3 7 6
(b) When not in hospital	5 10 0
Sufferer whose only dependent is a child or children	5 10 0
Each dependent child of a sufferer (additional to Child Endowment)	0 10 0

These rates are, of course, applicable only to sufferers who are infectious or in danger of becoming so, who give up work and undergo treatment, or are in process of rehabilitation after prolonged treatment.

AFTER-CARE AND REHABILITATION.

The success of any tuberculosis control programme can be in part measured by the effectiveness of its rehabilitation measures.

Patients needing rehabilitation may be classified roughly into three categories :—

- 1. Those in which treatment results in reasonable control of the disease. Many of these patients are able to return to their original employment, but others need assistance.

In this group, the Senior Medical Officer of the Commonwealth Department of Social Services reports the acceptance for training of 30 patients, after investigating a total of 80.

Many of these training courses are envisaged and commenced while the patient is still in the Sanatorium.

- 2. Those patients requiring careful graduated increase of activities under close medical supervision under sheltered working conditions. During the year 31 additional patients were employed at the Box Factory in Perth, managed by the Tuberculosis Association, and 32 graduated into normal or other employment.

There were 13 employed at the end of the year.

- 3. The third group comprises those patients who must live within the limits imposed on them by their illness. This is often a long-term necessity and it is for this purpose that the Tuberculosis Association is gradually developing its village settlement at Linley Valley adjacent to the Sanatorium.

This project is gradually coming to fruition and the State has every reason to be grateful for the assistance rendered by the administrative and voluntary workers of the Association.

RECORDS AND STATISTICS.

As at 31st December, 1952, there were 2,668 notified cases of tuberculosis on the Register, including 94 non-pulmonary (34 combined pulmonary and non-pulmonary). This gives a morbidity rate or prevalence for pulmonary tuberculosis of 428 per 100,000 of the population. Of these, 420 cases were in hospital and 1,615 were on the lists of the visiting nurses in the metropolitan area.

Three hundred and twenty-six individuals were removed following revision of the Register at this date. (211 inactive, 75 transfers and 40 revised diagnosis.)

Three hundred and ninety-six in receipt of the Tuberculosis Allowance, a decrease of 78 since 1st January, 1952. Two hundred and ninety of these were males, and 106 were females, 230 were receiving institutional treatment and 166 domiciliary supervision. Fifteen per cent. of those in receipt of the Allowance were migrants, of whom 7 per cent. were still displaced personnel.

There were 557 notifications of tuberculosis during the year, an increase of 53 on the previous year. There were 49 non-pulmonary notifications. The overall increase is accounted for by compulsory mass radiography surveys of the country areas, including the Goldfields. Some 141 of the notifications were migrants, of whom 66 had definitely arrived within the last five years. (75—time of arrival not stated.)

A total of 57,500 micro films were taken during the year, an increase of 73 per cent. on the previous year, this bringing the total number of exposures since the Chest Clinic opened in May, 1948, to 166,500.

A total of 11,660 large films were taken during the year, bringing this total for the same period to 43,432.

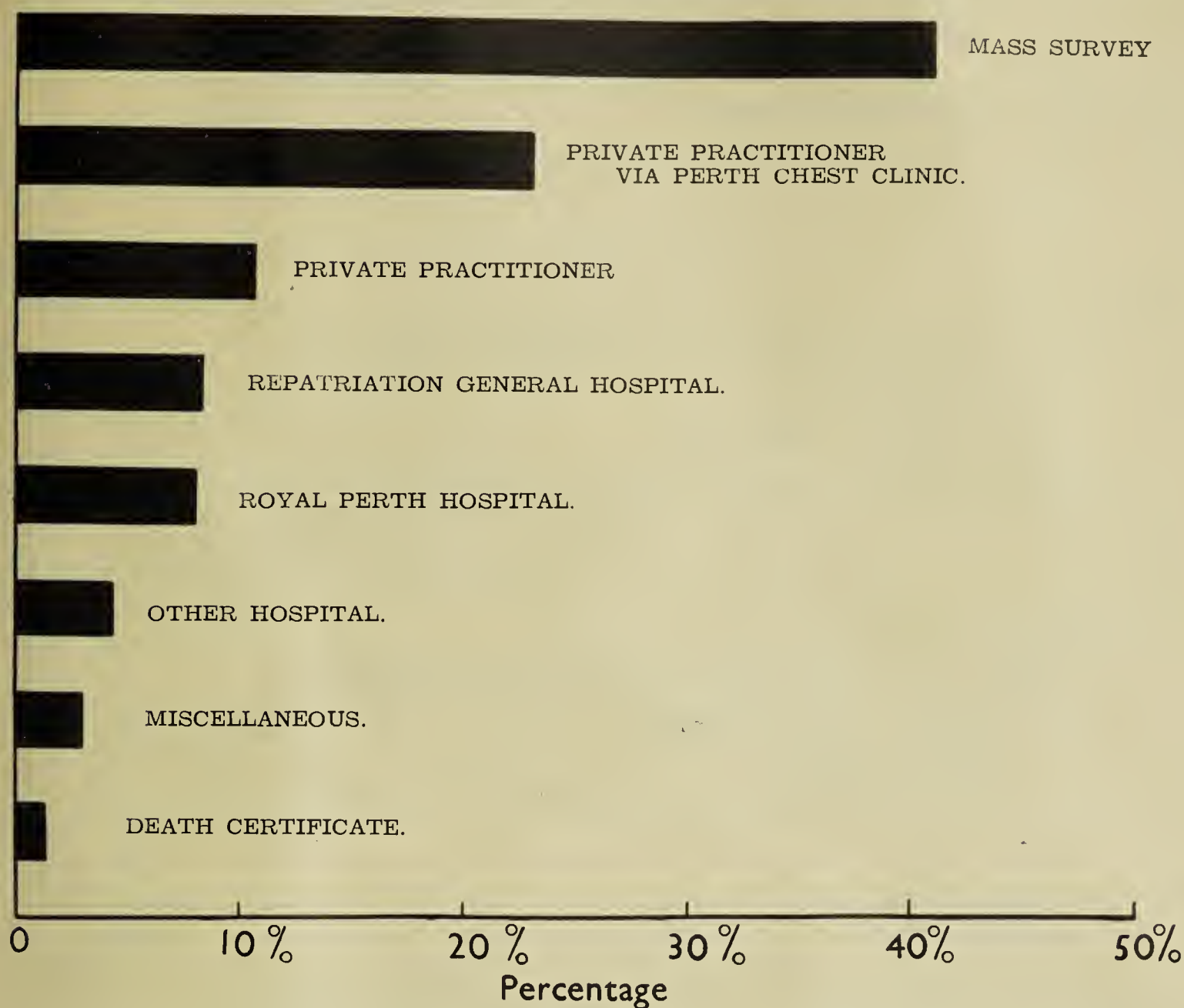
The death rate from pulmonary tuberculosis was 12·5 per 100,000 of population, which maintained the great improvement first evident last year.

Notifications and Deaths.

Year.	Mean Population (100,000).	Notifications.			Deaths.			Death Rate per 100,000.	
		Pulm.	Non- Pulm.	Total.	Pulm.	Non- Pulm.	Total.	Pulm.	All Forms.
1949	533	499	20	519	123	5	128	23·1	24·0
1950	559	586	18	604	125	3	128	22·3	22·9
1951	*581	467	37	504	76	6	82	*13·1	14·1
1952	602	508	49	557	75	7	82	12·5	13·6

* Amended figure.

SHOWING THE SOURCE OF NOTIFICATION OF CASES OF PULMONARY TUBERCULOSIS AS PERCENTAGE OF TOTAL NOTIFICATIONS.



CONCLUSION.

While it is possible to be optimistic about the stage reached in the control of tuberculosis in Western Australia, one must not jump to the conclusion that the drop in the number of annual deaths indicates that the problem is being mastered, as some 500 new cases are still being discovered every year.

Earlier case finding and improved medical and surgical treatment has produced a decline in the mortality of the disease, but some of the patients have merely had their lives prolonged and might still swell mortality figures in the future—apart from still being potential spreaders of infection.

Further progress will be possible with the completion of projects which will enable expansion of the activities of the Tuberculosis Control Branch.

The acquisition during the year of the property adjacent to the Perth Chest Clinic will enable its expansion, necessary because of the grossly over-crowded record, X-Ray and out-patient sections.

Approval in principle for the erection of the 200-bed Perth Chest Hospital was received from the Commonwealth Minister for Health towards the end of the year, and it is expected the coming year will see the completion of planning of this long-awaited project.

A property was purchased in High Street, Fremantle, in November and alterations are already in hand for conversion of the building into a modern Chest Clinic.

SUMMARY.

The year has shown a maintenance of progress in tuberculosis control measures.

The case finding programme continues to discover large numbers of sufferers from pulmonary tuberculosis in the community.

The results of treatment of the disease with newer drugs and surgical procedures are good, but the problem of relapse of disease has not been solved.

The annual death rate has shown slight further improvement in the record low figure reached the previous year.

My thanks are again due to all members of the staff who have contributed their help and enabled this summary of our work.

Abridged reports from the Tuberculosis Physician and the Medical Superintendent of the Wooroloo Sanatorium are attached.

ALAN KING, B.Sc., M.B., B.S., F.C.C.P.,
Director, Tuberculosis Control Branch.

APPENDIX III.

REPORT OF THE TUBERCULOSIS PHYSICIAN.

The Director, Tuberculosis Control Branch.

Sir,

I have the honour to submit a report for the year ended 31st December, 1952.

PERTH CHEST CLINIC.

Out-Patient Clinics.

These were held as before on Monday, Wednesday and Friday mornings.

Number of attendances	5,376
Average attendance per Clinic	34.4
Number of full size X-Rays taken	8,786

The number reporting is a little lower than in the previous year, as, under a new arrangement to streamline attendances, patients now attend only once for each review instead of twice.

Artificial Pneumothorax Clinics.

Four Clinics were held each week as in the past.

Number of patients attending for refills as at 31st December, 1952—

Unilateral Artificial Pneumothorax	34
Bilateral Artificial Pneumothorax	4
Pneumoperitoneum	1
Artificial Pneumothorax and Pneumoperitoneum	1
Total	40
Number of screenings	1,945
Number of refills	1,835

During the year many Artificial Pneumothoracies were abandoned either because they had been maintained for an adequate period or because of technical difficulties of maintenance.

MASS RADIOGRAPHY.

Perth Chest Clinic (Static Unit).

Number of 35 mm. exposures of groups X-Rayed include the following :—

Armed Services	3,635
Public Service	855
Private Patients (routine)	3,882
School children	59
K.E.M.H. patients	1,435
Contacts	3,866
National Service Trainees	3,073
Volunteers	14,163
Miscellaneous	3,634
Total	35,682

The number of retakes ordered on full size film was 1,351, representing 4.1 per cent. of the total.

Mobile X-Ray Unit (Metropolitan Area).

Number of 35 mm. exposures of groups X-Rayed were as follows :—

University of Western Australia	918
Army	143
Migrants	767
Fremantle Gaol	285
Sunset Old Men's Home	494
Mount Henry Home	244
Teachers' Training College	449
Total	3,300

Fremantle Mass Radiography (Special Voluntary Survey, 1st July, 1952, to 19th December, 1952).

Number of 35 mm. exposures of groups X-Rayed include :—

Private patients (routine)	209
Merchant Navy	120
Royal Australian Navy	58
Migrants	83
K.E.M.H. patients	47
Commonwealth Public Service	1
Volunteers	5,487
Total	6,005

MASS RADIOGRAPHY FINDINGS.

Cases of pulmonary tuberculosis diagnosed :—

Admitted to hospital	55
Under out-patient observation	17
Total	72
Suspect cases under out-patient observation	110
Incidence of bacteriologically proven tuberculosis (per thousand)	1.6
Non-tuberculous abnormalities diagnosed	189

B.C.G. VACCINATIONS (Metropolitan Area).

Mantoux Tests and B.C.G. Vaccinations at the Perth Chest Clinic and Princess Margaret Hospital.

Number of Mantoux tests performed—

Positive reactions	417
Negative reactions	819
Total	1,353
B.C.G. vaccinations	464

Many of the Mantoux tests were carried out for diagnostic purposes as well as on contacts and were not followed by B.C.G. if circumstances were not appropriate.

University of Western Australia.

All new enrolments were tested.

Number of Mantoux tests performed—

Positive reactions	195
Negative reactions	75
Total	270
B.C.G. vaccinations	40

Schools.

Tests were carried out on girls aged fifteen years and over in eight metropolitan schools.

Number of Mantoux tests performed—

Positive reactions	183
Negative reactions	232
Total	415
Number of B.C.G. vaccinations	213

All those with a positive reaction were advised that they could attend the Perth Chest Clinic for a chest X-Ray.

National Service Trainees.

Number of Mantoux tests performed—

Positive reactions	1,485
Negative reactions	1,173
Total	2,658
Number of B.C.G. vaccinations	1,141

Total number of Mantoux tests carried out by Visiting Nurses 4,696

Total number of B.C.G. vaccinations in Metropolitan area 1,858

PRIVATE CASES REFERRED FOR CHEST X-RAY.

The number of patients referred has again increased, but the percentage of tuberculosis discovered is still declining. The following table shows the trend over the last few years.

Year.						Incidence of proven tuberculous disease.
1949	....	....	....	....	....	2·7%
1950	....	....	....	....	....	3·3%
1951	....	....	....	....	....	2·0%
1952	....	....	....	....	....	1·7%

The decline in the return of tuberculosis discovered was last year attributed to a less critical attitude on the part of local doctors to those referred for X-Ray ; however, the practice of ordering a film of the chest purely as a routine measure has been growing, so that during the present year almost half the patients come under this category.

This is regarded as a highly desirable development and is undoubtedly the correct explanation of the lessening incidence. The results in detail are as follows :—

Total number of cases referred by private practitioners	....	....	....	7,888
Normal X-Rays	....	....	....	7,183
Cases of pulmonary tuberculosis diagnosed—				
Admitted to hospital	....	....	....	101
Under Out-Patient observation	....	....	....	30
		Total	....	131
Suspect cases under Out-Patient observation	....	....	....	75
Non-tuberculous abnormalities diagnosed	....	....	....	499

ROYAL PERTH HOSPITAL.

As in past years all new patients attending the Hospital were x-rayed on 35 mm. film and those for whom full size films were ordered were referred to this Clinic.

Number of patients referred	....	....	....	238
Number of patients referred and not attended at end of year	....	....	....	34
Cases of pulmonary tuberculosis diagnosed—				
Admitted to hospital	....	....	....	18
Under Out-Patient observation	....	....	....	7
		Total	....	25
Suspect cases under Out-Patient observation	....	....	....	52
Non-tuberculous abnormalities diagnosed	....	....	....	22

FREMANTLE HOSPITAL CLINIC.

This Clinic was conducted as in the past on Monday afternoons. The figures are as follows :—

Total number of attendances	....	....	....	1,326
Cases referred by private practitioners	....	....	....	239
Attendances of known cases of tuberculosis	....	....	....	496
Volunteer X-Rays	....	....	....	239
Contact X-Rays	....	....	....	125
New cases of tuberculosis discovered	....	....	....	17

From July, 1952, all volunteer X-Rays and the majority of cases referred from private practitioners, together with all contact X-Rays, were taken at the Fremantle Mass Radiography Unit.

Artificial Pneumothorax Clinic.

Number of cases receiving pneumothorax—				
Unilateral pneumothorax	....	....	....	10
Bilateral pneumothorax	....	....	....	3
		Total	....	13
Total number of refills given	....	....	....	212
Average number of refills per Clinic	....	....	....	5

In-Patients.

During the last twelve months our three beds have been used largely for cases requiring active treatment.

Total number of patients treated—				
Pre and post-apicolysis	....	....	....	3
Chemotherapy only	....	....	....	5
		Total	....	8

VISITING NURSES.

Sister Cockerell, the senior Visiting Nurse, reports :—

Number of patients visited in the metropolitan area	....	....	....	1,615
Number of visits made	....	....	....	6,504
Number of patients with positive sputum	....	....	....	126

These figures show a considerable increase over those for the previous year and represent a significant expansion in the volume of work carried out.

COMMENT.

The number of private cases referred for X-Ray of the chest has again increased, but as mentioned previously the incidence of proven tuberculosis in this group continues to decline.

The percentage of proven cases of tuberculosis amongst those X-Rayed under the Mass Radiography scheme is the lowest yet recorded by this Clinic ; however, it is too early as yet to accept this as an indication of a declining incidence of undiscovered tuberculosis in the general adult population.

The year has been a very full one and it is felt that this Clinic is indeed carrying out its function as the nerve centre of the Tuberculosis Control organisation.

ACKNOWLEDGMENTS.

I would like to record my thanks to all members of the Staff for their willing services and continuous co-operation throughout the year.

F. E. HEYMANSON,
Tuberculosis Physician, Tuberculosis Control Branch.

Sputum Results—Prior to Chemo-Therapy—

Positive direct smear	....	....	....	....	....	....	....	99 (57·2%)
Negative smear, Positive culture (sputum or gastric contents)	....	....	....	....	....	....	....	74 (42·8%)

Sputum on Discharge—

Positive direct smear	....	....	....	....	....	....	....	21 (12·1%)
Positive culture	....	....	....	....	....	....	....	11
Negative on culture	....	....	....	....	....	....	....	141 (82%)
No. who received active treatment	....	....	....	....	....	....	....	48

ACTIVE TREATMENT.

The number of cases subjected to artificial pneumothorax decreased considerably in comparison with previous years, and there was a corresponding increase in the number of patients receiving major surgical treatment. In only seven patients was artificial pneumothorax attempted as an elective procedure and in five of these a satisfactory collapse was established with division of adhesions.

Details of treatment are as follows :—

Resections—

Pneumonectomies	....	....	....	....	....	....	....	8
Pleuro-pneumonectomy	....	....	....	....	....	....	....	1
Lobectomies	....	....	....	....	....	....	....	10
Resection of lobe plus segment	....	....	....	....	....	....	....	1
Segmental resections	....	....	....	....	....	....	....	2
Revision resections of lung	....	....	....	....	....	....	....	2
Revision resection of lobe	....	....	....	....	....	....	....	1
Thoracotomies	....	....	....	....	....	....	....	2
Drainage of empyema	....	....	....	....	....	....	....	1

Modified Thoracoplasty with Plombage—

Leucite spheres	....	....	....	....	....	....	....	27
Polythene sponge	....	....	....	....	....	....	....	20

In two cases it was necessary to remove the plomb six months after its installation.

Artificial Pneumothorax—

Inductions or attempted inductions	....	....	....	....	....	....	....	8
Satisfactory A.P. established	....	....	....	....	....	....	....	5
Thoracoscopies	....	....	....	....	....	....	....	6
Complete pneumolyses	....	....	....	....	....	....	....	4
Refills	....	....	....	....	....	....	....	500
Phrenic crushes	....	....	....	....	....	....	....	9
Pneumoperitoneum inductions	....	....	....	....	....	....	....	7

Sundry—

Minor operations	....	....	....	....	....	....	....	14
Pleural aspirations	....	....	....	....	....	....	....	56
Bronchoscopies	....	....	....	....	....	....	....	77

As in previous years, cases for major surgical procedures were transferred to the Royal Perth Hospital and remained there for the early part of their convalescence. Adhesion sections, phrenic crushes and bronchoscopies were carried out at the Sanatorium.

MEDICAL STATISTICS.

Admissions	....	....	....	....	....	....	....	....	282
Discharges	....	....	....	....	....	....	....	....	254
Deaths	....	....	....	....	....	....	....	....	23

Average stay in hospital of discharged patients—

1952	....	....	....	....	....	Males	....	....	41 weeks
						Females	....	....	37 weeks
1951	....	....	....	....	....	Males	....	....	61 weeks
						Females	....	....	47 weeks

The number of miners and ex-miners admitted during the year was extremely high, no less than 49 (or 17·3 per cent. of all admissions) being in this category.

Included amongst the admissions also were 78 patients who had previously been in Wooroloo Sanatorium on one or more occasions, and 11 who were previously treated in other tuberculosis institutions. Of these, 67 were first re-admissions, 19 were second re-admissions, and 3 were third or more re-admissions. Forty-four patients were re-admitted within one year of previous discharge, 36 between one and five years, and 9 over five years after previous discharge.

Table 3.—*Re-admissions within one year of discharge—Total 44.*
(Average stay in hospital on previous occasion—46 weeks).
Conservative treatment—37.

Treatment.	Type of Disease.	Status on Discharge.		
		*Arrested.	Still Active.	
			Irreg. Disch.	Approved.
Conservative with Chemo-therapy	Minimal	3	....	....
	Moderately advanced	7	1	1
	Advanced	8	4	6
Conservative with no Chemo-therapy	Moderately advanced	3	2	....

Discharged pending results of investigation—2.

* “Arrested” is placed in inverted commas because the early discharge of patients was often necessitated by an acute shortage of beds, and chemo-therapy was continued right up to the date of discharge, it being impossible to check the results of sputum examination following the cessation of treatment.

Active Treatment—7.

Complicated A.P. (Parenchymal disease controlled)	....	....	....	1
Failed A.P. ....	....	....	....	1
Complicated Thoracoplasty—				
Old Empyema with draining sinus ....	....	....	....	1
Old Empyema with gross bronchial stenosis ....	....	....	....	1
Complicated Plombage (infected extra-pleural space)	....	....	....	1
Failed Plombage ....	....	....	....	1
Contra-lateral breakdown after Pneumonectomy ....	....	....	....	1

Re-admissions one to five years after discharge—Total 36.

There were 36 cases re-admitted between one and five years after previous discharge. Twenty-four, or 66 per cent. of these were over 40 years of age. All had moderately advanced or advanced disease on their previous discharge. Treatment had been conservative in all but five, and of these, two had had plombage with re-activated disease under the collapse, one had had bilateral artificial pneumothoraces which had both been abandoned prior to his discharge, one had had a thoracoplasty followed by revision which was still unsatisfactory, and one had a complicated A.P. which necessitated re-admission.

Re-admissions over five years since discharge—Total 9.

Discharges.

The number of “arrested” patients discharged is an indication of the success of chemo-therapy and of active treatment.

Number of Discharges—			
“Arrested” cases	....	....	184 (72·7%)
“Inactive”	....	....	7
Active disease	....	....	52 (20%)
Non-tuberculous	....	....	10
Total	....	....	253

Of the 52 cases of active disease, 14 were transferred to other hospitals, 33 went home to satisfactory conditions, and there were four irregular discharges.

Deaths.

Of the 23 deaths which occurred at the Sanatorium, 17 only were due directly to tuberculosis. Of the remaining six, one patient had a carcinoma of the lung with superimposed tuberculosis, the carcinoma being regarded as the cause of death ; two had leukemia with mild tuberculosis superimposed ; two others whose tuberculosis was controlled died suddenly of coronary occlusions, and the sixth had a non-tuberculous lung abscess.

A comparison of figures with regard to deaths, and the state of disease on discharge for the years 1948 to 1952 is appended hereunder.

Preparation of culture medium—

Youman's	....	....	....	....	....	....	....	....	....	47 doz.
Dorsett's Egg	....	....	....	....	....	....	....	....	....	5 doz.
Petragnani's	....	....	....	....	....	....	....	....	....	5 doz.
Lowenstein's	....	....	....	....	....	....	....	....	....	476 doz.
Lowenstein's Anti-Biotic	....	....	....	....	....	....	....	....	....	42 doz.
Total	....	....	....	....	....	....	....	....	....	575 doz.

X-Ray.

Details of X-Ray examinations carried out are as follows :—

Chest films	....	....	....	....	....	....	....	....	....	2,567
Screenings	....	....	....	....	....	....	....	....	....	975
Tomograms	....	....	....	....	....	....	....	....	....	113
Bronchograms	....	....	....	....	....	....	....	....	....	4
Bone and joint X-Rays	....	....	....	....	....	....	....	....	....	317
Dental films	....	....	....	....	....	....	....	....	....	31
Sundries	....	....	....	....	....	....	....	....	....	23

Administration.

Mr. J. L. Cross, as Secretary, has rendered valuable service throughout the year, and I am grateful to him and his staff for their consistent co-operation.

Buildings.

During the year work continued on the conversion of the top block into quarters for staff. The old tutor school and the tinsmithy were both converted into single room accommodation and now all the available space in the Institution is utilised for staff accommodation.

Work was commenced on the erection of eight new cottages for staff, and it is expected that these will be ready for occupation early in 1953.

The erection of a sterilising room adjacent to the theatre was completed, and renovations to the theatre and old Colony Office, which will be used as a dental surgery, are in progress.

A change room for the Engineer's staff was completed and provides satisfactory changing facilities and a rest room for the members of the maintenance staff.

The sick quarters were completed and occupied in June, providing comfortable conditions and facilities for the treatment of our sick staff and also more adequate facilities for the treatment of out-patients of whom there is a gradually increasing number in attendance.

Work is still proceeding on the refractory ward, which it is anticipated will be available for use in the early part of 1953.

An incinerator was erected for the disposal of all dry and wet refuse and serves a most useful purpose in the sphere of general hygiene.

Plans have been drawn up for the installation of a new sewerage scheme for the whole Institution, and it is hoped that work will commence on this early in 1953.

Leprosarium.

Two new patients were admitted to the Leprosarium during the year, bringing the total to five. Sulphone treatment was continued, and all patients have continued to improve, one having been negative on all smears for nine months and the second, who had extensive disease on admission, having converted during the last two months.

Linley Valley.

Considerable development in this activity of the Western Australian Tuberculosis Association has taken place. This included the installation of septic tanks in all houses, the completion of electrical wiring in the houses and workshops, and the installation of power machines in the tinsmithy. The office was connected by telephone with the Sanatorium exchange and the administrative staff moved into their new quarters. The Colony is now completely divorced from the Sanatorium, although its community is still under our constant medical supervision.

Finally, Sir, I desire to express my appreciation of your help throughout the year, and also that of the Commissioner of Public Health, the Under Secretary and Assistant Under Secretaries, and the staffs of the Public Health Department and Tuberculosis Control Branch.

H. R. ELPHICK, M.B., B.S.,
Medical Superintendent.

APPENDIX V.

WESTERN AUSTRALIA.

PULMONARY TUBERCULOSIS.

Year.	Population in 1,000's.	Notifications Received.	Incidence Rate per 100,000 Population.	Deaths Registered.	Mortality Rate per 100,000 Population.
1911	287	259	90·2	190	66·2
1912	301	429	142·5	220	73·1
1913	313	424	135·5	206	65·8
1914	323	353	109·3	229	70·9
1915	321	336	104·7	233	72·6
1916	313	511	163·5	225	71·9
1917	306	464	151·6	217	70·9
1918	308	432	140·5	245	79·5
1919	320	467	145·9	289	91·6
1920	330	442	135·9	259	78·4
1921	334	424	126·9	277	82·9
1922	341	387	113·8	256	75·1
1923	351	361	102·8	216	61·5
1924	363	381	104·6	228	62·8
1925	373	403	108·4	259	69·4
1926	381	415	108·2	252	66·1
1927	392	409	104·3	231	56·4
1928	408	395	96·8	282	69·1
1929	421	400	95·0	245	53·4
1930	429	569	132·6	218	50·8
1931	432	372	86·1	223	51·6
1932	435	339	77·9	203	46·7
1933	439	295	67·2	207	47·2
1934	442	287	64·9	218	49·3
1935	447	270	60·4	210	47·0
1936	452	338	74·8	193	42·7
1937	457	239	53·0	172	37·6
1938	464	247	53·2	177	38·1
1939	470	202	43·0	179	38·1
1940	473	231	48·8	181	38·3
1941	474	154	32·5	185	39·0
1942	477	113	23·7	175	36·7
1943	477	273	57·3	144	30·2
1944	481	219	45·4	134	27·9
1945	488	271	55·5	149	30·5
1946	493	343	69·6	163	33·1
1947	503	372	74·0	128	25·5
1948	515	325	63·1	157	30·5
1949	533	499	93·6	123	23·1
1950	559	586	104·8	129	23·1

DEATH CLASSIFICATIONS ACCORDING TO 6TH (1948) INTERNATIONAL LIST.

1950	559	586	104·8	125	22·3
1951	581	467	80·4	76	13·1
1952	602	508	84·4	75	12·5

APPENDIX VI.

REPORT ON THE WORK OF THE CANCER RESEARCH UNIT
FOR THE YEAR ENDED 31st DECEMBER, 1952.

As the Cancer Research Unit was inaugurated in March, 1951, the first Annual Report was submitted in March, 1952. In order to conform with departmental usage this, the Second Annual Report, deals with the work of the laboratory from 1st March, 1952, to 31st December, 1952. Future annual reports will run from January to December.

The work carried out during the nine months under review falls under the following headings :—

1. Equipment of the laboratory and maintenance of stocks of mice.
2. Alterations of personnel.
3. Experimental investigation of cancer treatments.
4. Continued investigation of thermal and other properties of mouse tumours.
5. Publications and Lectures.
6. Consolidation of future plans.

1.—EQUIPMENT OF LABORATORY AND MAINTENANCE OF STOCKS OF MICE.

Early in 1952, it became evident that the delicate thermal control necessary in the experiments on the properties of mouse tumours was not attainable while the possibility of power cuts continued. An auxiliary power plant was therefore installed, serving the cancer laboratory and the Animal Nutrition Laboratory also. This has been and is still working well and no further trouble has occurred.

Towards the end of the year, Major Albert Pam, of the Pressed Steel Company, Cowley, England, donated a further deep freezing apparatus but owing to lack of room this is not yet installed and working.

New mouse boxes and steel racks and an improved type of mouse drinking bottle have been provided.

The mice are breeding well. At the present time the stocks are as follows :—

R111 strain	....	....	....	Breeders	....	....	....	....	360
				For experiment	....	....	....	....	15
C57	....	....	....	Breeders	....	....	....	....	250
				For experiment	....	....	....	....	70
C3H	....	....	....	Breeders	....	....	....	....	55
Unclassified young	....	....	....	....	....	....	....	....	100
Mice under experiment	....	....	....	....	....	....	....	....	160
Total mice alive at present									1,010

This compares favourably with the 200 alive on 1st March, 1952. In addition, of course, a number have been killed in experiments during the year.

Mice with tumours have been supplied to Sydney laboratories.

In June, a donation of 23 mice from the United States was received through the kindness of Sir Edward Hallstrom. These also are breeding well, though some doubts of their genetic purity are felt. This is being investigated.

2.—ALTERATIONS OF PERSONNEL.

(a) Dr. Nancy Helen Barham Paton, M.B., B.S. Adelaide, was appointed Medical Research Trainee on 1st June, 1952, and has proved invaluable to the laboratory.

(b) Miss Joan Cox resigned at the end of May to go to England.

(c) Miss Audrey Woods was appointed full time Technician Trainee from November, 1952.

(d) Professor Gye died on 14th October, 1952.

(e) Professor Ida Mann was appointed Director of the Laboratory and Ophthalmic Advisor to the Public Health Department on 1st January, 1953.

3.—EXPERIMENTAL INVESTIGATION OF CANCER TREATMENTS.

(a) *Mycetine*.

The investigation of the preparation "Mycetine" was brought to a conclusion by the visit of Dr. David Curnow to Geneva in August on behalf of the laboratory. He interviewed the representatives of Medicina and of Neotherapie S.A. and came to the conclusion that the strain of the Streptothrix felis D-A had been lost and that the sale of "Mycetine" as containing 1000 mouse units of the streptothrix extract per cc. was fraudulent. He did not obtain a live culture or indeed any evidence that such existed. A suit is being brought in the Swiss Courts by the Swiss Federal Government against Neotherapie. All this is most regrettable as, had the original strain been obtained, it would have been of great value for investigation. However, a fraud has been exposed and dealt with.

(b) *X-ray Sickness.*

In May and June a small amount of work was done on the use of ACTH to relieve X-Ray and radium sickness at the Royal Perth Hospital. It was, however, found that the problem was not a pressing one and in view of the price of ACTH and the almost equally good results of pyridoxine and other remedies, only a few cases were treated.

4.—THERMAL AND OTHER PROPERTIES OF MOUSE TUMOURS.

These experiments, begun in 1951, have been continued with interesting results, but many more will have to be carried through before a conclusion is reached.

Experiments with the C48 chemically induced sarcoma of mice seem to show that tumour producing activity falls off rapidly at room temperature, less rapidly at 0°C. and less rapidly still at —28°C. At —79°C. activity falls rapidly in the first few hours but rises again up to at least six days and thereafter is maintained indefinitely. These results are new and more work must be done to confirm and interpret them. We wish to record here our gratitude to the Swan Brewery for their gift of a constant supply of solid CO₂ for this work.

A second set of experiments on the possibility of transmitting white mouse sarcoma to black mice (hitherto never successful) is being carried out by Dr. Paton, using long deep freezing of the original tumour. It is too early yet to say whether the experiment will be successful, but the tumour has so far been passaged through five successful transplants.

Experiments on the thermal properties of the R111 carcinoma seem to show that this tumour is much more thermolabile than the C48 sarcoma. No transmission has been obtained at —28° and this seems to indicate that it will not be possible to filter the Bittner milk factor in its active form, since it will disappear during filtration, which cannot be done at such low temperatures.

A set of histological investigations was undertaken to try and find any differences in appearance of tumour tissue treated in various ways at different temperatures. The results bear out the opinion of most workers that histology will not show fine differences with any degree of certainty.

5.—PUBLICATIONS AND LECTURES.

The following papers were published from the laboratory in 1952.

W. E. Gye : What do we know about Cancer ? (United Nations World. 25th June, 1952. p. 35)

Ida Mann : Endocrine disorders of the eye. (Trans.Oph.Soc. Aus. (B.M.A.), Vol. XI, 1951, p. 16, 26.) (copies attached).

Lectures on cancer, on embryology, on research and on endocrinology were given to the B.M.A. in Melbourne and in Perth to the Royal Perth Hospital residents, to the Pharmacists of Perth, to Perth Rotary, and to the optometrists at the University.

6.—CONSOLIDATION OF FUTURE PLANS.

In March, 1952, Major Cameron of the Royal Engineers, Swan Barracks, approached Professor Gye with ideas for collecting funds for the extension of cancer research. This aroused much interest and after Major Cameron was posted to Malaya, further support was forthcoming from Dr. John Day, Mr. Eric Sandover and Mr. Frank Churchill. On the 18th May, Professor Gye arranged for a meeting at his house at which a committee composed of :—

Mr. R. Forsaith	Miss Muriel Weick
Mr. Eric Sandover	Dr. John Day
Mr. Frank Churchill	Dr. Buttsworth
Mr. Shaw	Dr. Gye
	Dr. Mann

was formed to consider ways and means of furthering cancer research in Western Australia. This committee visited the Smythe Road laboratory and were shown round by Dr. Gye who pointed out that additional rooms were needed there. It was proposed to form a Fund for collecting for a Cancer Research Institute of W.A., the first objective of which should be to build another mouse room, an experimental laboratory and an office on to the existing room at Smythe Road. Dr. Gye and Dr. Bennetts (Department of Agriculture) discussed the building of an addition to both, since the building would ultimately revert to Dr. Bennett's Department.

This was reviewed in an interview with Mr. Stitfold and Mr. Devereux, who both approved the idea. Dr. Bennetts, Dr. Snoek, Dr. Peterson (Department of Agriculture) and Dr. Gye then made a sketch plan and this was submitted to Mr. Stitfold.

Meanwhile, the idea of a Cancer Research Institute was being further discussed by the Committee with Dr. Gye, who pointed out that the real requirements of the State would be better met by the establishment of an Institute for Research in General Pathology (of which Cancer Research is a branch). Other States and countries have founded such Institutes, which ultimately become affiliated with University Departments of Pathology in Medical Schools where they exist. The scope of the Fund was therefore

extended. Articles of Incorporation were drawn up. (A copy of the Constitution and Rules of the resultant Cancer and Pathological Institute of Western Australia is attached). Incorporation was obtained at the time of Dr. Gye's death.

The Council met last on the 23rd January, 1953, and appointed a Sub-Committee to draw up a scheme of the immediate aims of the Institute with a view to widening its scope still further.

SUMMARY.

The past year has seen the consolidation of the Cancer Research Laboratory and the beginning of the implimentation of Professor Gye's scheme for an Institute of General Pathological Research. His most regretted death in October, just as the Institute was incorporated, imposed a temporary check on activities but the scheme has aroused widespread support and will be proceeded with as soon as possible.

IDA MANN,
M.R.C.S., L.R.C.P., M.B., B.S., F.R.C.S.

APPENDIX VII.

ABSTRACTS OF CONTRIBUTIONS TO THE LITERATURE BY
AUTHORS ASSOCIATED WITH THE DEPARTMENT.

By D. J. R. Snow.

KING, A. (1952).

The Medical Journal of Australia, ii., 151-152, 10 references.

"The Function of a Chest Clinic."

In this communication, the Director of the Tuberculosis Control Branch of the Department gives brief outline of some of the factors leading up to the establishment of the Perth Chest Clinic, and describes its function. This latter is discussed under the headings of "Administration," "Prevention of Disease," "Case Finding," "Medical Care," "Social and Economic Protection" and "Rehabilitation." In the "Conclusion" attention is drawn to the necessity for Clinic Physicians to play their part in the diagnosis and suggested management of non-tuberculous chest diseases. Finally, it is mentioned that the Clinic has proved acceptable to the profession.

HEYMANSON, F. E. (1952).

The Medical Journal of Australia, ii., 153-154, 6 references.

"Tuberculosis Case Finding in Perth."

The Tuberculosis Physician reports that since the inauguration of the Perth Chest Clinic in May, 1948, and up till 31st December, 1951, 16,150 patients referred from private practitioners have been X-Rayed, and 450 bacteriologically proven cases of tuberculosis have been discovered. These results are comparable with those of other authors. It is emphasised that no other case finding technique can produce comparable results with a similar economy of effort. The role of the general practitioner in the field of tuberculosis case finding is stressed. Out of 3,908 contacts followed up and X-Rayed, 31 cases of active tuberculosis were found (0.79 per cent.—as against 2.45 per cent. among private patients). The mass radiography programme has revealed disease in 0.25 per cent. of those examined.

ANDERSON, R. (1952).

The Medical Journal of Australia, ii., 154-157, 4 references.

"Report on Pulmonary Tuberculosis in a General Hospital."

This report by the Medical Superintendent of the Royal Perth Hospital demonstrates the value of routine chest X-Ray examination of all hospital in-patients and out-patients, both for the detection of patients suffering from pulmonary tuberculosis and for the protection from infection of the nursing staff. It is the outcome of co-operation between the Hospital and the Tuberculosis Control Branch. Of 17,094 patients admitted to hospital between 1st July, 1949, and 30th June, 1951, a proportion of six to seven per thousand was found to be suffering from active and infectious pulmonary tuberculosis. In approximately two-thirds of the patients referred to medical clinics, pulmonary tuberculosis was the pathological condition causing the symptoms complained of. Findings in the various age groups and ward groups are set out in detailed tables which should be referred to in the original by those interested.

KELSALL, G. A. and VOS, G. H. (1952).

The Medical Journal of Australia, i., 349-356, 18 references.

"The Antibody Titre in Maternal and Infants' Serum as an Indication for Treatment in Haemolytic Disease of the Newborn."

This is a report of work undertaken at the King Edward Memorial Hospital under the auspices of the Department. Its aim was to explore the possibility of reducing the number of infant deaths and stillbirths due to Rhesus incompatibility. A detailed study of 43 cases gives reason to believe that adoption of the following principles will lead to the desired reduction in foetal and infant deaths from this cause:—

- (1) The employment of standardised anti-globulin tests to determine the optimum time of delivery.
- (2) Treatment by "exchange" blood transfusion as soon as possible after delivery.
- (3) The perfusion of at least three times the infants' blood volume.
- (4) The blood used must be freshly collected into heparin, and administered either by the umbilical—vein—cannula method, or the saphenous—radial artery method.

Abstractor's Note :

These principles have since been rigidly applied by the same team in a further 60 cases in which the mortality rate was 18.5 per cent.—a figure which compares very favourably with those of other workers in England and America.

GYE, W. E. (1952).

United Nations World, June, 1952, 35.

"What do we know about Cancer."

SNOW, D. J. R. (1952).

The Medical Journal of Australia, ii., 17-19, 10 references.

"Poliomyelitis and Atmospheric Conditions in Certain Australian Cities."

This report was the outcome of a study which was initiated in Perth during the 1948 epidemic, and was subsequently pursued and related to conditions in Sydney, Melbourne and Adelaide. It endeavoured to ascertain whether there was any association between poliomyelitis prevalence on the one hand, and temperature and atmospheric humidity on the other. The author's conclusion was as follows: "There has been an apparent relationship between atmospheric conditions and poliomyelitis epidemics in four Australian capital cities during the last four years. This relationship has not been of a consistent type, but further studies are warranted. The suggestion that atmospheric conditions may influence poliomyelitis prevalence through the portal of entry of the virus is worthy of more attention."

SNOW, D. J. R. (1952).

The Medical Journal of Australia, ii., 22-23, 8 references.

"A case of poliomyelitis with facial paralysis following a dental procedure."

Poliomyelitis with facial paralysis followed closely upon "mandibular block" and dental extractions in a schoolboy aged eight years. It was investigated with the co-operation of the Dental Branch of the Department. Available evidence suggested that the dental procedure may have precipitated paralysis in a boy already infected with poliomyelitis. The evidence, however, was only circumstantial, and specific investigations conducted by others during the poliomyelitis epidemic of 1948 showed no association between poliomyelitis and dental procedures.

WATSON, J., and VOS, G. H. (1952).

The Medical Journal of Australia, ii., 336-339, 10 references.

"A Study of Maternal Rh Agglutinin Titres in Pregnancy."

This contribution was the result of work carried out at the King Edward Memorial Hospital Branch of the Public Health Laboratory. It is complementary to the report by Kelsall and Vos (1952) which has been abstracted elsewhere. Thirty Rh-negative pregnant women were studied for periods of two to eight months before delivery. High maternal antibody titres were associated with severe haemolytic disease in the new-born. Icterus gravis occurred in the latter when the final maternal titres were 64 or more. Milder forms of haemolytic disease occurred when the titres were less than 64. No stillbirths occurred when the terminal titre was low. A terminal rise in titre carried a very unfavourable prognosis. The study has been of value in demonstrating that routine agglutinin titrations are useful in assessing the likely effect of Rhesus incompatibility in the new-born infant.

APPENDIX VIII.

REPORT OF THE EPIDEMIOLOGIST.

To the Commissioner of Public Health.

Sir,

You will recall that the appointment of Epidemiologist was created on 18th December, 1951. This report for the year 1952 is, therefore, the first annual report being made to you in that capacity.

The main object of the appointment was to develop the systematic control of communicable disease and to co-ordinate the activities of local health authorities in this field. Outbreaks of infectious diseases were to be investigated and appropriate recommendations were to be submitted to you from time to time, for the purpose of more effectively checking the spread of these diseases.

The appointment has been the first of its kind within an Australian State Health Department, and has created much interest in the other States, at least one of which has made provision for a similar appointment. The desirability of vesting responsibility for communicable disease control in one individual or team within the general framework of the Public Health Organisation has, however, long been appreciated in America. Almost every American State Health Department has its Bureau or Division of Communicable Diseases, administered by a Director who is himself an Epidemiologist or has one such on his staff. The arrangement works well, has obvious administrative advantages, makes for greater efficiency and assists in the preservation of the public health.

Although most of my working hours during the year have been devoted to infectious disease in one or other of its many aspects, you will be aware that much time has been given, at your direction, to certain other assignments which departmental exigencies have rendered necessary. Thus, time has been spent on the Stillbirth Inquiry, Maternal Mortality, the medical care and instruction of certain nurse trainees, and interviews and correspondence unrelated to infectious diseases.

This report, however, will be confined only to Communicable Diseases. A tabulated statement of notifications received, together with known deaths for 1952 and the three preceding years, is presented herewith. In general, the prevalence of communicable diseases in the State during the year under review was at a lower level than in previous years. Hepatitis, however, has continued unabated in epidemic form. There has been a conspicuous reduction in poliomyelitis, and a "record low" in the prevalence of diphtheria. The persistence of certain intestinal infections also commands attention, while an unusually large number of cases of rubella occurred. Further comment on these conditions will follow.

Infective Hepatitis.

This infectious disease again occupied the most conspicuous position in terms of number of notifications recorded. As was pointed out in the previous annual report, it is a relatively new epidemic disease in the State, appears to spread by personal contact, and is very difficult to control. Special inquiries during the year indicated that a considerable number of nurses have suffered from the disease, that its general epidemiological pattern is very similar to that of poliomyelitis, and that transmission probably takes place through the mechanism of faecal transference. In other words, it is a disease which should be capable of reduction or control through scrupulous personal hygiene, especially the washing of hands after visits to the toilet, and before meals. Apart from three contributions to the Medical Journal of Australia (which have since been published), efforts have been made to disseminate information about the disease to nurses, local health authorities, health inspectors, and the general public, in the hope that a wider knowledge of the likely methods of transmission would assist in controlling spread.

Poliomyelitis.

Since 1948, this disease has persisted in endemic form, but the 37 corrected notifications recorded during 1952 represent the lowest annual figure for five years. Experiences elsewhere give reason for concern because there have been frequent and recurrent epidemics in the Eastern States. In the present state of our knowledge, however, it is impossible to predict the behaviour of this serious disease. All that can be said is that comparatively low prevalence over a succession of several years engenders a sense of uneasiness.

The Poliomyelitis Committee of the National Health and Medical Research Council held its first meeting in Adelaide in February, and after a free and valuable exchange of views between the various State representatives, standard policies were adopted in regard to various administrative measures. A full report was subsequently made to the State Poliomyelitis Advisory Committee, and, as a result of one of its recommendations, a social worker was appointed to investigate and assess the aftermath of the disease. She has done and is continuing to do work of great value.

Over 500 cases of poliomyelitis have been recorded during the last five years, and preliminary results of the social survey indicate that approximately 26 per cent. of these have been left with a physical disability sufficient to interfere with daily life and restrict the avenues of gainful employment. More than half of these so handicapped are under the age of 15 years. This survey will be completed during 1953 and a detailed report will then be submitted. Meanwhile, whatever can be done to promote the welfare of former poliomyelitis patients, is being done.

The study of the apparent relationship between poliomyelitis and atmospheric conditions in Western Australia (which was first described in the Annual Report for 1948) was extended to include other capital cities in the Commonwealth. A paper on the subject was published in the Medical Journal of Australia during the year and attracted much attention overseas. A comprehensive investigation has since been undertaken in the United Kingdom. Results, however, although interesting, have proved inconclusive, and it is probable that we will have to look elsewhere for an explanation as to why poliomyelitis suddenly becomes epidemic.

Diphtheria.

It is most gratifying to be able to report that the 124 corrected notifications registered during the year represents the lowest rate on record in this State for the last fifty years. It is the outcome of energetic immunisation at Local Authority Clinics, and a progressively increasing public demand for artificial protection. This demand has been stimulated and sustained by regular publicity. All available instrumentalities have co-operated and played their part in increasing the popularity of artificial immunisation, so much so that there is a growing public demand for similar protection against other diseases such as whooping cough and tetanus.

The history of diphtheria in Western Australia and full details regarding the number of immunisations recorded have been described elsewhere. There can be little doubt that further reduction in incidence is possible and that, in fact, the disease can be virtually eradicated by immunisation alone. However, it will be necessary to conduct a ceaseless campaign if the necessarily high level of immunity is to be maintained.

The "hand-to-mouth" infections.

Among these must be included the dysenteries, the salmonella infections and gastro-enteritis, infantile diarrhoea, and the typhoid group of fevers. All of these conditions have taken their toll during the year. Few, if any, of these cases are likely to have been water-borne, some may have been due to flies, but the majority have probably been due to defective hand hygiene. When the possibility of poliomyelitis and hepatitis being spread in a similar way is also considered, the importance of improved hand hygiene becomes outstanding. The education of children, the more rigid supervision of food-handlers, and the more adequate protection of food are the most obvious counter-measures. It is my opinion that the dominant theme in modern communicable disease control should be "clean hands." The methods whereby this objective can be attained are by no means simple, but they are fundamental. They cannot be introduced quickly by legislation, but they can be brought about gradually by the development of a strong public opinion and demand. A Health Authority guides, advises and endeavours to protect the public, but the people to a large extent must help themselves. Only when the advantages of clean hands have been fully appreciated, and when opinion has been adequately mobilised, will standards of hand hygiene be improved, and the prevalence of hand-to-mouth infections be reduced.

Rubella.

This relatively trivial but highly infectious disease acquires importance from the damage the virus can cause to unborn children in the event of pregnant women becoming infected in the early stages of pregnancy. The hazard is now widely appreciated by the public, and practitioners are prompt in notifying suspects and in utilising convalescent serum or pooled serum for the protection of pregnant women who have been exposed to infection. The valuable work of the Red Cross Blood Transfusion Service in this connection must be acknowledged. Several requests were received from young women, who were newly married or about to be married, asking for artificial infection to be arranged. The procedure, however, is too dangerous to undertake owing to the risk of transferring poliomyelitis inadvertently, and these requests have had to be refused. It would be wise policy to encourage the spread of rubella in girls' schools in order that immunity may be developed before the marrying and child-bearing ages.

Additions to the List of Notifiable Diseases.

Two conditions were added to the list of Notifiable Diseases during the year; they were Erythema Nodosum and Pleural Effusion. In addition, a definition of "Infantile Diarrhoea" was gazetted; this condition, which is believed to be widely prevalent during the summer months, and which is responsible for a number of deaths, was made notifiable in 1949, but practitioners were reluctant to report cases unless known to be infective in nature or unless the condition was precisely defined. After several alternatives had been considered, the following definition was eventually adopted: "Infantile Diarrhoea shall mean diarrhoea of more than 48 hours' duration in an infant under two years of age." It is apparent from the number of infant deaths registered with the Register-General as having been due to gastro-enteritis and colitis that many cases of infantile diarrhoea are not being notified, but it is hoped that as practitioners become accustomed to the proclaimed definition, notification will be more complete. Until then, it will not be possible to develop satisfactory control measures.

"Notes on Communicable Diseases."

The Departmental Booklet entitled "Notes on Communicable and Notifiable Diseases" was revised during the year and was amended in accordance with the recommendations of the National Health and Medical Research Council. Periods of isolation, quarantine, and exclusion from school have now become

standardised throughout Australia. The booklet has been distributed to all Local Health Authorities, Medical Officers of Health and other practitioners, and school teachers, and has proved of great value in securing uniformity of action throughout the State.

Quarantinable Diseases Council.

There are six diseases which are subject to Federal Quarantine Law. They are : small-pox, plague, yellow fever, cholera, louse typhus, and leprosy. It is the responsibility of the Commonwealth Quarantine Service to prevent the importation of these infections into the State, but in the event of any of them slipping through the quarantine cordon, the State Health Authority would be largely responsible for confining the infection and limiting its spread. Leprosy is, of course, endemic in the northern part of the State ; small-pox and plague have occurred before ; but yellow fever, cholera, and louse typhus have never been recorded. The last-named occasions little or no concern because circumstances propitious to its spread are unlikely to develop. Cholera is always a possibility, but yellow fever is the more dangerous threat. In the event of any of these diseases occurring ashore, swift and concerted action would be necessary. There would be little time to ponder and carefully weigh the advantages of one or other administrative measure. For these reasons it was considered advisable to establish a Quarantinable Diseases Council for the purpose of preparing comprehensive plans to deal with any of these emergencies. The personnel of this Council includes the Commissioner of Public Health, the Senior Commonwealth Health Officer, the Medical Officer of Health of the Perth City Council, the Senior Infectious Diseases Physician, the Medical Superintendent of the Royal Perth Hospital, the Director of Medical Laboratories, and the Epidemiologist. If need be, other officers would be co-opted from time to time.

Points for consideration are isolation, hospital accommodation, medical and nursing facilities, quarantine, disinfection and disinfestation, artificial immunisation, and a host of other administrative problems. Detailed plans along these lines have already been completed for small-pox and plague, and plans are in the course of preparation for yellow fever and cholera. The time and thought given to these problems now will prove of inestimable benefit if and when any emergency arises in the future. The existence of definite clear-cut policies is reassuring, should engender confidence, and will be a safeguard against hasty and perhaps ill-advised decisions during a period of stress.

D. J. R. SNOW, M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.P.H. (Syd.),
Epidemiologist.

APPENDIX IX.

INCIDENCE AND MORTALITY OF NOTIFIABLE INFECTIOUS DISEASES.

Diseases Notifiable.	1949.		1950.		1951.		1952.		
	Cases Re-ported.	Deaths.	Cases Re-ported.	Deaths.	Cases Re-ported.	Deaths.	Cases Re-ported.	Amend. Diag-nosis.	Deaths.
Acute Rheumatism	....	....	....	....	8	....	9	9	....
Amoebiasis	13	....	14	....	5	....	5	5	....
Ankylostomiasis	52	....	132	....	13	....	8	8	....
Brucellosis	9	....	7	....	8	....	6	6	....
Chorea	....	....	....	....	....	....	3	3	....
Dengue Fever	1	....	1	....	....	....	....	....	....
Diphtheria	170	4	172	7	271	11	156	124	2
Dysentery (Amoebic)	5	....	5	....	2	....	6	6	....
Dysentery (Bacillary)	22	2	45	1	56	1	72	72	†1
Encephalitis Lethargic	....	....	1	....	....	....	....	....	....
Encephalitis Virus	....	....	5	2	....	....	....	....	....
Hydatid	....	....	....	....	1	....	....	....	....
Infantile Diarrhoea	6	*21	4	*26	46	*30	15	15	†17
Infective Hepatitis	8	....	36	4	467	3	654	654	9
Lead Poisoning	....	....	....	....	....	....	4	4	....
Leprosy	51	1	60	....	48	3	37	37	....
Malaria	13	....	15	1	7	....	13	13	....
Meningococcal Infection	13	4	24	5	20	3	35	35	4
Paratyphoid	....	....	....	....	3	....	3	3	1
Poliomyelitis	61	6	57	5	94	4	42	37	2
Pleural Effusion	....	....	....	....	....	....	21	20	....
Puerperal Fever	7	2	2	....	4	....	3	3	....
Purulent Ophthalmia	3	....	14	....	23	....	58	58	....
Rubella	101	....	45	....	137	....	147	147	....
Salmonella Infection	11	....	6	....	16	....	22	22	....
Scarlet Fever	199	....	198	....	179	....	128	125	....
Tetanus	9	} 7	11	6	12	4	13	13	6
Tetanus Neonatorium	1		....	....	....	....	1	1	....
Trachoma	....	....	....	....	....	....	1	1	....
P.T.B.	499	123	586	125	467	73	524	488	75
Other T.B.	20	5	18	3	37	10	50	49	7
Typhoid Fever	15	....	7	1	11	....	6	6	1
Typhus Fever	61	2	32	....	24	1	25	25	1

Deaths exclude full blood aboriginals.

* Under two years of age.

† Gastro-enteritis and Colitis (except ulceration) under two years.

‡ Also one death from "other or unspecified dysentery."

APPENDIX X.

THE HISTORY OF SOME COMMUNICABLE DISEASES IN
WESTERN AUSTRALIA (1828-1951), PART II.

BY

D. J. R. SNOW.

The first part of this feature was published in the Annual Report for 1951, and dealt with smallpox and plague. The present instalment concerns diphtheria, scarlet fever, whooping cough and measles.

III. DIPHTHERIA (1828-1951).

It would appear that Diphtheria was introduced into Western Australia during the year 1864, and that the epidemic which followed lasted for about three years (Cumpston, 1927). Thereafter, despite irregular fluctuations in prevalence, diphtheria occupied a conspicuous position as a cause of death for several decades.

In 1902, it was declared a notifiable disease and a useful measure of prevalence became available. Annual notification rates remained at high levels until 1920, and then declined. Meanwhile, the introduction of antitoxin in treatment (as opposed to toxoid for prevention—which was first used fifteen years later) led to a striking reduction in case fatality.

During the nineteen-thirties prevalence increased once more, and an annual tally of 1,000 notifications was attained on three occasions—the average annual number being about 600. This level was maintained throughout World War II.

After the war, however, notifications began to diminish, and the average annual number during the six years, 1946-1951, was a little over 260.

Altogether over 33,000 cases have been notified during the last fifty years, and over 1,500 West Australians have died from diphtheria.

One interesting feature of the disease which has excited comment in recent times has been the number of adults who have been attacked. Thirty years ago 25 per cent. of sufferers were over the age of fifteen years. During the last three years, however, this proportion has increased to exactly 40 per cent. Thus, although diphtheria is still mainly a disease of children, a considerable number of adults are now being affected.

This change in the age pattern is probably due to more than one factor. Smaller family size, less overcrowding, and a higher standard of living would tend to reduce opportunities for infection in early childhood; while artificial immunisation itself, by reducing the number of cases in children, might have brought into greater prominence the proportion of adult sufferers who have emerged from the pre-immunisation era. In other words, although the actual number of adult cases may not have increased, the relative proportion of these has done so.

Immunisation.—The greatest landmark in the history of diphtheria in Western Australia has been artificial immunisation. It was introduced on an organised basis in 1934-35, but was slow to gain popularity, and was hampered by the war. Since the war the tempo of immunisation has been stepped up, and there is reason to believe that over 65 per cent. of children in the State have now been protected.

The following observations which were made in the Annual Report for 1949 will bear repetition.

“It is nevertheless of the highest importance that a maximum immunisation rate be maintained if the disease is to be abolished from the community. The low incidence of diphtheria affording, as it does, fewer opportunities for the development of natural immunity from small harmless infections, together with the steadily increasing child populations, contribute to the creation of a large pool of susceptible persons, who will provide fertile soil in the event of an epidemic. Inadequate immunisation constitutes the third leg of a tripod upon which the risk of a potential epidemic rests. In other words, as incidence decreases, the need for immunisation increases. Thus, any relaxation in the demand for immunisation would be dangerous . . .”

The precise degree of protection conferred by artificial immunisation is a question which often exercises the minds of parents. The most suitable answer is that artificial immunisation with the methods hitherto used confers “a substantial degree of protection against catching the disease, and almost certain protection against death from it.” No authentic case is on record in Western Australia of a child who has died from diphtheria despite prophylactic inoculation against the disease. A number, however, have developed diphtheria, mainly in a mild form, although they have been inoculated previously. Since 194

medical practitioners have been asked to state, when notifying a case of diphtheria, whether the patient had been previously inoculated or not. The relative proportion of notifications in these two groups of patients is indicated in the following table :—

Year.	Total Notifications.	Number previously inoculated.
1948	255	80
1949	170	56
1950	172	64
1951	271	75
Total	868	275 (31·7%)

In other words, approximately one-third of all patients suffering from diphtheria have been previously inoculated against the disease.

Immunisations.

Data relating to the number of immunisations performed has been assembled from previous Annual Reports and from half-yearly returns submitted by Local Health Authorities. The figures are incomplete because they do not take into account those immunisations carried out privately by family doctors. Information concerning these immunisations is very difficult to obtain. Estimates in various areas suggest that anything between 30 per cent. and 50 per cent. of all immunisations are conducted privately. Nevertheless, the figures which are presented hereunder are of some interest, because they represent the known minimum number of immunisations carried out in the State :—

1934–1945	84,541
1946	8,453
1947	7,493
1948	5,787
1949	10,469
1950	7,598
1951	7,877

Seasonal Incidence of Diphtheria.

	1947.	1948.	1949.	1950.	1951.	Total.	Per cent. of Total.
January	19	31	10	8	20	88	7·3
February	22	23	20	12	23	100	8·3
March	28	14	24	14	34	114	9·4
April	24	28	18	10	18	98	8·1
May	46	31	15	20	41	153	12·6
June	34	26	17	13	24	114	9·4
July	44	13	11	19	17	104	8·6
August	25	20	7	24	18	94	7·8
September	29	19	14	7	28	97	8·0
October	19	10	9	13	20	71	5·9
November	23	13	8	17	11	72	6·0
December	28	27	17	15	17	104	8·6
	339	255	170	172	271	1,209	....

Comparison with Other States.

Despite a decline in the prevalence of diphtheria in the State, the notification rate does not compare favourably with those of other Australian States. In other words, Western Australia's record has lagged behind in a field of preventive medicine where outstanding achievement is possible. The following Notification Rates computed by the Commonwealth Department of Health for the years 1947–1951 show the relative positions in each State :—

	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.
1947	25·49	19·72	41·34	14·39	72·17	24·83
1948	19·77	18·71	13·62	12·00	49·53	22·68
1949	20·14	18·75	14·73	5·64	31·89	6·97
1950	12·09	14·79	14·59	5·00	30·79	6·02
1951	11·81	8·42	11·35	6·11	46·61	2·73

CHARTS AND TABLES.

1. Mortality Rate in Quinquennial Periods, 1866-1950.



QUINQUENNIAL PERIODS.

NOTE.—Deaths and Rates 1866-1923 include "Croup".

Period.	Average Mean Population.	Diphtheria Deaths in Period.	Mortality Rate per 100,000 Mean Population.
1866-1870	23,544	56	47.57
1871-1875	25,956	44	33.90
1876-1880	28,390	35	24.65
1881-1885	31,913	59	36.97
1886-1890	43,226	64	29.61
1891-1895	66,551	102	30.65
1896-1900	154,938	105	13.55
1901-1905	218,625	122	11.16
1906-1910	260,398	395	30.33
1911-1915	309,010	198	12.81
1916-1920	315,516	175	11.09
1921-1925	352,471	105	5.95
1926-1930	406,082	106	5.22
1931-1935	439,079	130	5.92
1936-1940	463,321	165	7.12
1941-1945	479,274	143	5.96
1946-1950	520,477	37	1.42

Greatest number of deaths in any one year : 1908 with 111 deaths—rate : 43·05.
Highest mortality rate in any one year ; 1883 with 25 deaths—rate : 79·23.

Sources :

Deaths—

1866–1923 :

Cumpston, J. H. L. (1927) “ The History of Diphtheria, Scarlet Fever, Measles and Whooping Cough in Australia, 1788–1925,” Service Publication No. 37, Department of Health, Commonwealth of Australia.

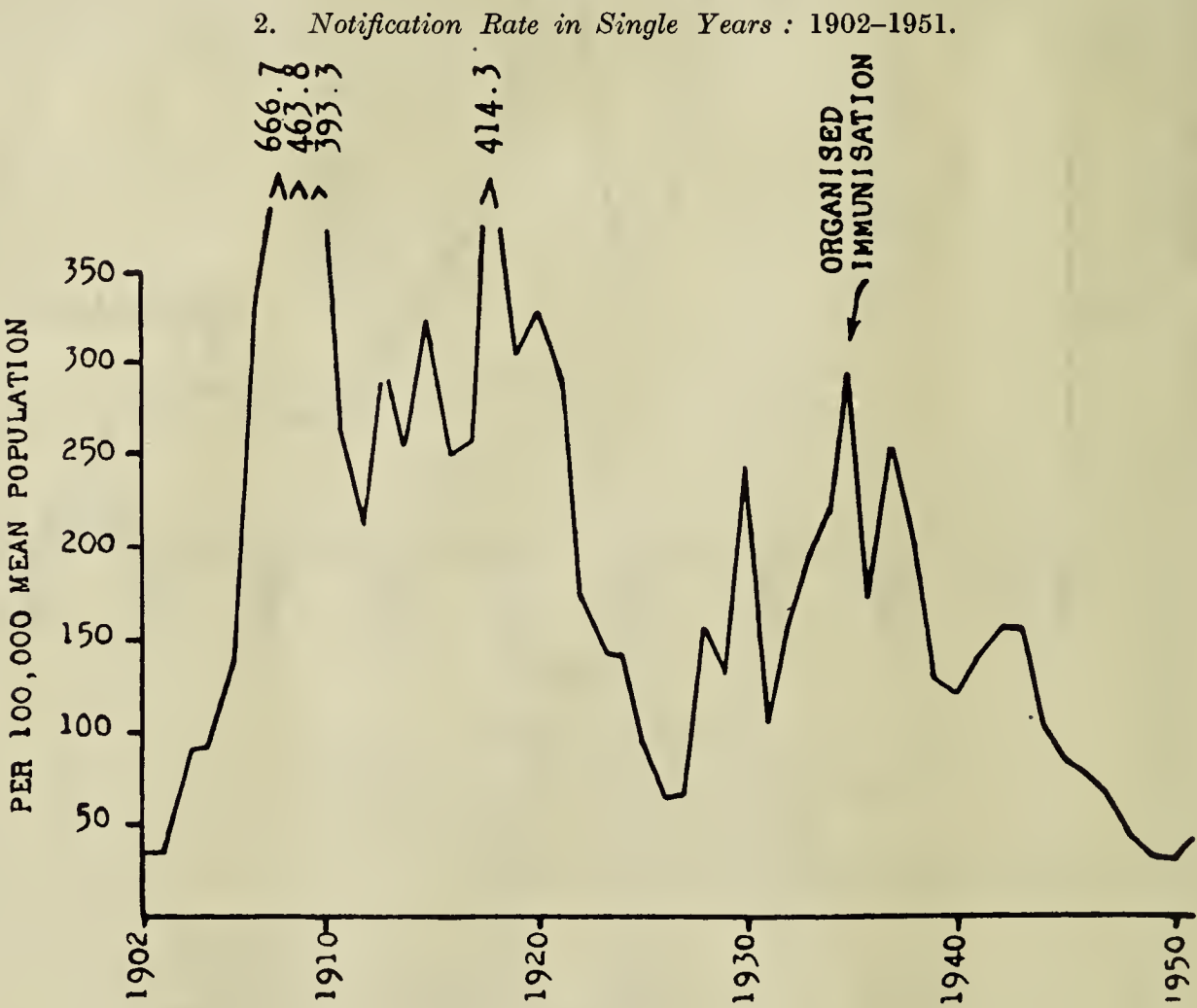
1924–1950 :

Statistical Register of Western Australia.

Mean Calendar Populations :

1866–1949, Demography 1949. 1950.

Calculated as per standard formula from figures obtained from Monthly Bulletin of Government Statistician, Western Australia.



3. Mortality and Morbidity : 1853–1951.

Year.						Mean Calendar Popu- lation.	Noti- fications Re- ceived.	Deaths. Diph- theria and “ Croup ” until 1923.	Case Mortality Per Cent.	Incidence Rate per 100,000 Population.	Mortality Rate per 100,000 Population.
1853	....	....	....	....	....	9,022	....	1	....	....	11·08
1855	....	....	....	....	....	12,174	....	2	....	....	16·43
1856	....	....	....	....	....	12,881	....	3	....	....	23·29
1859	....	....	....	....	....	14,690	....	1	....	....	6·80

3. *Mortality and Morbidity; 1853-1951—continued.*

Year.						Mean Calendar Popu- lation.	Noti- fications Re- ceived.	Deaths. Diph- theria and “Croup” until 1923.	Case Mortality Per Cent.	Incidence Rate per 100,000 Population.	Mortality Rate per 100,000 Population.
1865	....	....	....	....	....	20,872	....	25	....	....	119.77
1866	....	....	....	....	....	21,876	....	16	....	....	73.14
1867	....	....	....	....	....	22,759	....	16	....	....	70.30
1868	....	....	....	....	....	23,720	....	4	....	....	16.86
1869	....	....	....	....	....	24,473	....	14	....	....	57.20
1870	....	....	....	....	....	24,894	....	6	....	....	24.10
1871	....	....	....	....	....	25,291	....	2	....	....	7.90
1872	....	....	....	....	....	25,652	....	7	....	....	27.28
1873	....	....	....	....	....	25,904	....	10	....	....	38.60
1874	....	....	....	....	....	26,204	....	18	....	....	68.69
1875	....	....	....	....	....	26,729	....	7	....	....	26.18
1876	....	....	....	....	....	27,338	....	9	....	....	32.92
1877	....	....	....	....	....	27,958	....	9	....	....	32.19
1878	....	....	....	....	....	28,427	....	7	....	....	24.62
1879	....	....	....	....	....	28,876	....	4	....	....	13.85
1880	....	....	....	....	....	29,350	....	6	....	....	20.45
1881	....	....	....	....	....	29,859	....	1	....	....	3.34
1882	....	....	....	....	....	30,586	....	2	....	....	6.54
1883	....	....	....	....	....	31,551	....	25	....	....	79.23
1884	....	....	....	....	....	32,816	....	23	....	....	70.08
1885	....	....	....	....	....	34,753	....	8	....	....	23.02
1886	....	....	....	....	....	38,282	....	9	....	....	23.51
1887	....	....	....	....	....	42,212	....	16	....	....	37.90
1888	....	....	....	....	....	43,817	....	10	....	....	22.82
1889	....	....	....	....	....	44,737	....	15	....	....	33.52
1890	....	....	....	....	....	47,081	....	14	....	....	29.73
1891	....	....	....	....	....	50,840	....	17	....	....	33.44
1892	....	....	....	....	....	55,873	....	28	....	....	50.11
1893	....	....	....	....	....	61,746	....	21	....	....	34.01
1894	....	....	....	....	....	73,251	....	19	....	....	25.93
1895	....	....	....	....	....	91,047	....	17	....	....	18.67
1896	....	....	....	....	....	118,666	....	14	....	....	11.79
1897	....	....	....	....	....	148,656	....	35	....	....	23.54
1898	....	....	....	....	....	163,687	....	41	....	....	25.05
1899	....	....	....	....	....	168,568	....	11	....	....	6.52
1900	....	....	....	....	....	175,113	....	4	....	....	2.28
1901	....	....	....	....	....	188,135	....	11	....	....	5.84
1902	....	....	....	....	....	204,705	73	9	12.33	35.6	4.39
1903	....	....	....	....	....	219,643	81	22	27.16	36.8	10.01
1904	....	....	....	....	....	233,963	216	40	18.52	92.3	17.09
1905	....	....	....	....	....	246,681	228	40	17.54	92.4	16.21
1906	....	....	....	....	....	254,362	347	65	18.73	136.4	25.55
1907	....	....	....	....	....	255,510	821	69	8.40	321.3	27.00
1908	....	....	....	....	....	257,822	1,719	111	6.45	666.7	43.05
1909	....	....	....	....	....	263,279	1,221	81	6.63	463.8	30.76
1910	....	....	....	....	....	271,019	1,066	69	6.47	393.3	25.46
1911	....	....	....	....	....	286,712	764	37	4.71	266.4	12.55
1912	....	....	....	....	....	301,040	634	35	5.52	210.6	11.62
1913	....	....	....	....	....	313,383	957	46	4.80	305.3	14.67
1914	....	....	....	....	....	322,668	785	40	4.72	243.2	11.46

3. *Mortality and Morbidity, 1853-1951—continued.*

Year.	Mean Calendar Popu- lation.	Noti- fications Re- ceived.	Deaths. Diph- theria and “Croup” until 1923.	Case Mortality Per Cent.	Incidence Rate per 100,000 Population.	Mortality Rate per 100,000 Population.
1915	321,247	1,045	40	3.63	325.2	11.82
1916	313,066	757	33	3.30	241.8	7.99
1917	306,339	800	32	3.87	261.1	10.11
1918	308,198	1,277	27	2.11	414.3	8.95
1919	319,955	971	33	3.39	303.4	10.31
1920	330,023	1,080	50	4.62	327.2	15.15
1921	334,084	958	44	4.59	286.7	13.17
1922	341,375	377	21	3.6	169.0	6.12
1923	350,772	504	20	3.97	143.6	5.70
1924	363,152	511	14	2.7	140.7	3.85
1925	372,970	334	6	1.7	94.9	1.60
1926	380,930	256	11	4.3	67.2	2.88
1927	392,071	273	6	2.9	69.6	1.53
1928	407,576	639	13	2.0	156.7	3.19
1929	420,756	539	33	6.0	128.1	7.84
1930	429,079	1,045	43	4.1	243.5	10.02
1931	432,347	452	19	4.2	104.5	4.39
1932	435,041	664	20	3.0	152.6	4.59
1933	438,780	848	20	2.4	193.2	4.55
1934	442,354	974	36	3.7	220.1	8.13
1935	446,874	1,308	35	2.6	292.7	7.83
1936	452,294	792	36	4.54	175.2	7.95
1937	457,328	1,166	39	3.34	259.3	8.52
1938	463,808	921	41	4.44	198.5	8.83
1939	469,780	610	27	4.4	129.9	5.74
1940	473,397	583	22	3.75	123.1	4.64
1941	473,988	674	20	3.00	142.1	4.21
1942	476,619	748	41	5.48	156.9	8.60
1943	476,745	755	38	5.03	158.3	7.97
1944	481,498	528	24	4.80	109.6	4.98
1945	487,510	425	20	4.70	87.1	4.10
1946	492,771	380	11	2.89	77.1	2.23
1947	502,978	339	8	2.36	67.3	1.59
1948	514,843	255	7	2.74	49.5	1.35
1949	533,083	170	4	2.35	31.88	0.75
1950	558,709	172	7	4.07	30.78	1.25
1951	581,462	271	11	4.06	46.60	1.89

“Mean Population : Method of Calculation. From 1901 onwards the mean population for any year has been calculated by the formula :—

$$\text{Mean population} = \frac{a + 4b + 2c + 4d + e}{12}$$

12

where a, b, c, d, and e respectively are the populations at the end of the quarter immediately preceding the year at the end of each of the four succeeding quarters, e.g., in the case of a calendar year, 31st December of the preceding year and 31st March, 30th June, 30th September and 31st December of the year under consideration. This formula gives a close approximation to the mean of a theoretical population progressing smoothly through the five values, a, b, c, d, and e.

Prior to 1901 the mean population was obtained by taking the arithmetic mean of the population at the end of the previous year and the year in question.” :—Year Book of the Commonwealth of Australia, No. 38, 1951, p. 523.

Sources.

Commonwealth Demography.
Statistical Register of W.A.

Cumpston, J. H. L. (1927), "The History of Diphtheria, Scarlet Fever, Measles and Whooping Cough in Australia, 1788-1925." Commonwealth of Australia Service Publication No. 37.
Monthly Reports of the Government Statistician, W.A.

IV. SCARLET FEVER (1828-1951).

There is no record of Scarlet Fever in Western Austrlaia prior to 1860. "The first recorded death from this disease was in 1865, in which year there was one death. Thereafter, for 30 years, there was no other death. In 1895 there was again one death." (Cumpston, 1927). From then, until 1908, it accounted for one or two deaths every year, but the actual prevalence of the disease is difficult to assess. From 1909 onwards annual notification figures are available, and Cumpston has left analysed records of these for the period 1909-1924. Data for the period 1925-1951 has now been prepared and is here presented. This brings the record for Scarlet Fever in Western Australia up-to-date as far as it is possible to do so.

In Figure I, prevalence of the disease for the last 43 consecutive years is shown as a notification rate (per 100,000 of the population). The periodicity, which is so characteristic of communicable disease in general, is well depicted. Years of high prevalence were 1910, 1918-20, 1929, 1937-8, 1943 and, more recently, there is a small peak for 1948. The 1918 and 1943 rates are most conspicuous, and it is reasonable to as- sociate these with servicemen involved in the two world wars.

The duration of the epidemic cycle is approximately eight years, and it is interesting to note that despite the advent of antibiotics the prevalence of the disease is still appreciable. In fact, in an analysis (which is presented elsewhere), of 2,163 consecutive admissions to the Infectious Diseases Hospital during a four-and-a-half year period from January, 1948, Scarlet Fever accounted for 421 or 19.5%. As a cause for hospitalisation it was exceeded only by diphtheria and poliomyelitis.

The actual number of notifications received for the various years is shown in Table II.

The comparative prevalence of Scarlet Fever for the various Australian States for the period 1947-1951 is shown in Table III (Notification Rates per 100,000 mean population), which is derived from data provided by the Commonwealth Director General of Health.

TABLE III.

				N.S.W.	Vic.	Q'land.	S.A.	W.A.	Tas.
1947	....	....	....	51.59	90.13	42.88	66.22	28.43	45.78
1948	....	....	....	44.63	86.60	32.94	38.59	52.05	25.32
1949	....	....	....	48.62	58.91	31.98	55.19	37.33	39.98
1950	....	....	....	32.44	41.61	37.83	65.13	35.44	43.58
1951	....	....	....	27.24	41.30	21.21	35.83	30.78	51.21

SCARLET FEVER NOTIFICATION RATE
WESTERN AUSTRALIA 1910-1950

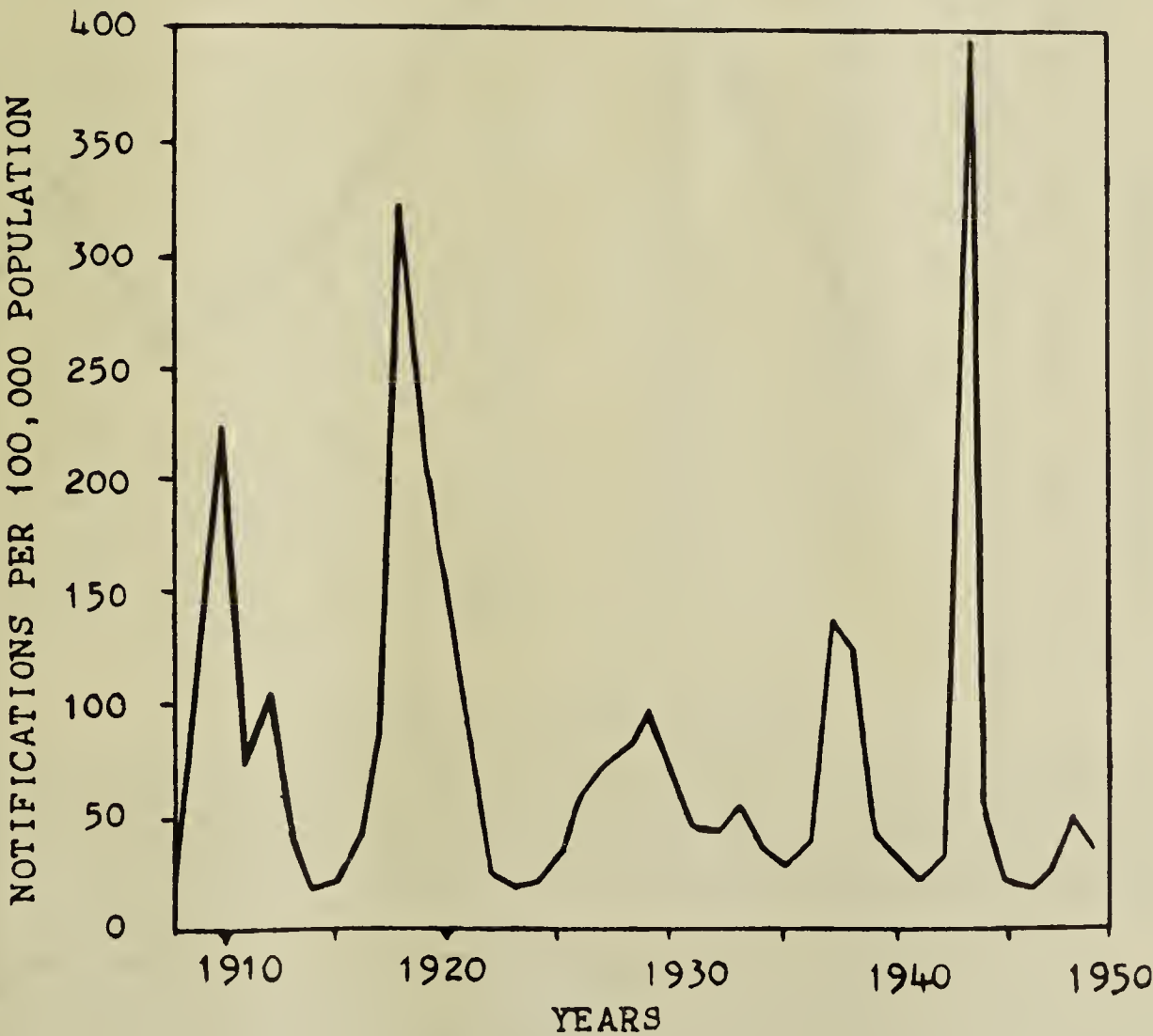


FIGURE 1

Seasonal Incidence.

The monthly distribution of notifications is available for three considerable periods of time totalling thirty-eight years (1908–22, 1924–38, and 1944–51). Altogether, during these three periods 10,035 notifications were registered, and the relative percentages of the respective months were as follows :—

					%
January	....	....	....	....	7.3
February	....	....	....	....	5.6
March	....	....	....	....	8.0
April	....	....	....	....	10.3
May	....	....	....	....	10.9
June	....	....	....	....	11.0
July	....	....	....	....	9.7
August	....	....	....	....	8.0
September	....	....	....	....	7.1
October	....	....	....	....	6.7
November	....	....	....	....	8.4
December	....	....	....	....	7.0

The monthly scatter during each of the three periods is substantially the same as that for the combined thirty-eight year period.

The accompanying line diagram (Figure IV.) shows the seasonal incidence of the disease in a form which can be readily appreciated. Prevalence is at a relatively low level during the summer, rises in the autumn, reaches a maximum in winter, and subsides in the spring. The six months, April to September, contribute 57 per cent. of all cases. The month of highest incidence (11 per cent.) is June, and the month of lowest (5.6 per cent.) is February. This type of seasonal incidence is common with infections which are transmitted from person to person by the droplet mechanism.

SEASONAL INCIDENCE OF SCARLET FEVER
WESTERN AUSTRALIA

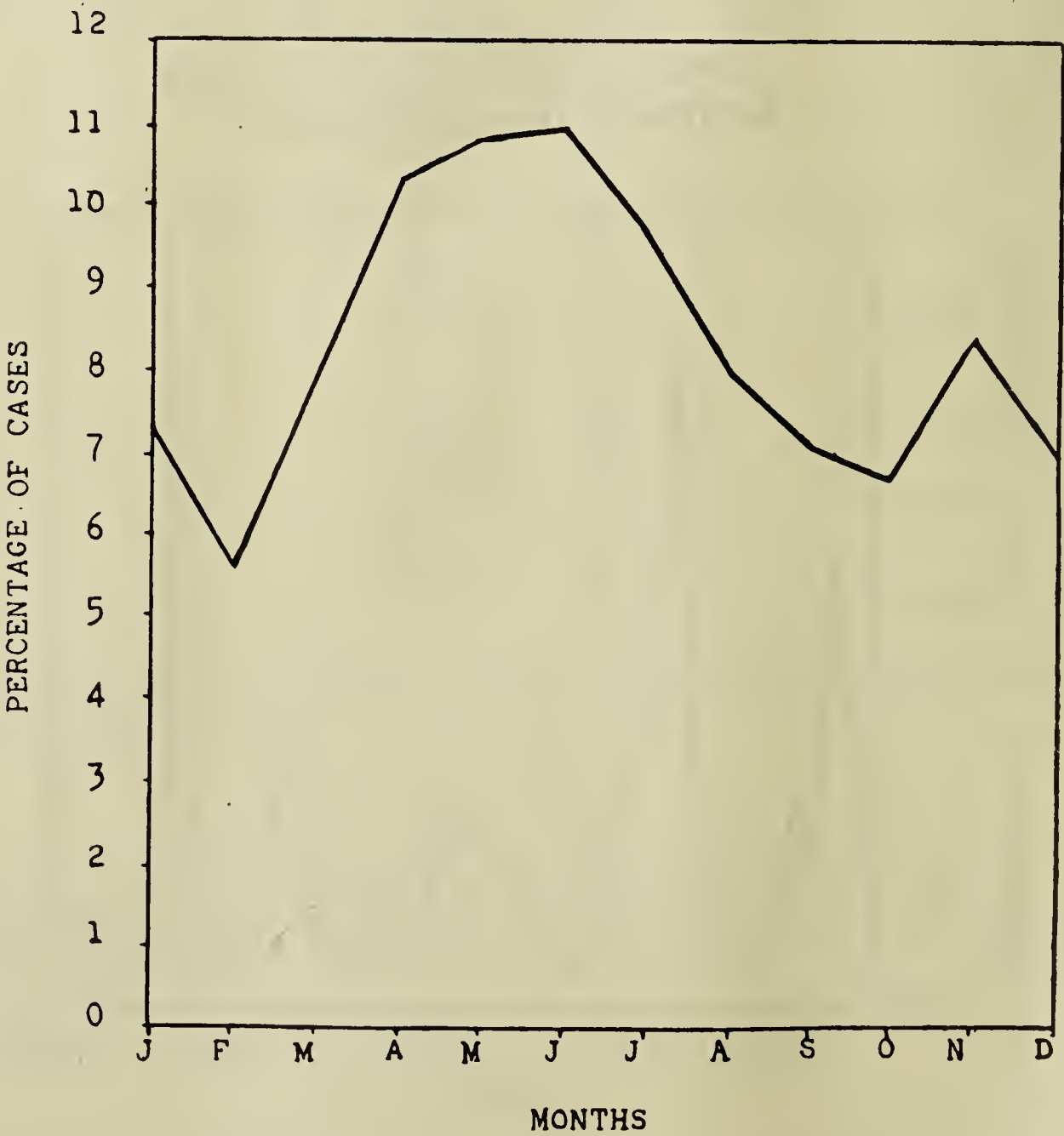


FIGURE IV

TABLE II.
Scarlet Fever (Notifications).

Year.				Notifications.	Mean Population (thousands).	Rate (per 100,000).	Deaths.
1908	....	....	....	82	258	31.8	2
1909	....	....	....	340	263	129.3	....
1910	....	....	....	592	271	218.4	2
1911	....	....	....	199	287	69.3	....
1912	....	....	....	308	301	102.3	6
1913	....	....	....	128	313	40.9	1
1914	....	....	....	45	323	13.9	1
1915	....	....	....	55	321	17.1	....
1916	....	....	....	121	313	38.7	?
1917	....	....	....	247	306	80.7	....
1918	....	....	....	1,003	308	325.6	10
1919	....	....	....	657	320	205.3	2
1920	....	....	....	468	330	141.9	....
1921	....	....	....	234	334	70.0	....
1922	....	....	....	96	341	22.3	1
1923	....	....	....	62	351	17.7	....
1924	....	....	....	66	363	18.2	1
1925	....	....	....	123	373	32.9	1
1926	....	....	....	225	381	59.0	1
1927	....	....	....	282	392	71.9	2
1928	....	....	....	350	408	85.8	2
1929	....	....	....	418	421	99.3	5
1930	....	....	....	296	429	68.9	2
1931	....	....	....	203	432	46.9	1
1932	....	....	....	182	435	41.9	2
1933	....	....	....	253	439	57.7	4
1934	....	....	....	152	442	34.4	1
1935	....	....	....	121	447	27.0	1
1936	....	....	....	173	452	38.3	1
1937	....	....	....	627	457	137.2	2
1938	....	....	....	551	464	118.7	....
1939	....	....	....	200	470	42.6	....
1940	....	....	....	142	473	30.0	1
1941	....	....	....	99	474	20.9	....
1942	....	....	....	139	477	29.1	....
1943	....	....	....	1,899	477	398.1	3
1944	....	....	....	290	481	60.3	1
1945	....	....	....	99	487	20.3	....
1946	....	....	....	88	493	17.8	....
1947	....	....	....	143	503	28.4	....
1948	....	....	....	268	515	52.0	....
1949	....	....	....	199	533	37.3	....
1950	....	....	....	198	....	....	....
1951	....	....	....	179	....	....	....

V. WHOOPING COUGH (1828-1951).

The history of Whooping Cough in Australia, including Western Australia, up to 1925 has been dealt with by Cumpston (1927). Mortality data for the period 1925-1950 has now been assembled, and the complete record is here presented. For the period 1833-1896 Cumpston's figures have been reproduced ; for 1897-1911, however, figures have been taken from the Statistical Register for Western Australia (1911) ; and for 1911 onwards they have been abstracted from the Statistical Registers for the individual years and from the Annual Reports.

Whooping Cough has never been a notifiable disease in Western Australia. No useful measure of morbidity is therefore available. The only data available is that of mortality, and this is possibly an incomplete measure of the prevalence of the disease, as pertussis deaths may be ascribed to broncho-pneumonia, pulmonary fibrosis, and bronchiectasis—conditions which may be either complications or sequelae of Whooping Cough.

The mortality rate for the period 1833–1950 is set out in the accompanying Table (I.), and is also shown in the line diagram (Figure II.).

According to Milligan, Whooping Cough first appeared in Western Australia in October, 1833, and was introduced by a military detachment from the Eastern States, which included the wives and children of troops. Soon after its introduction there was adverse criticism in the “Perth Gazette” condemning parents for allowing afflicted children to run about without consideration of the risk to other children. In 1848 the infection was re-introduced off a ship and a widespread epidemic involved almost every home. Fifteen children died. In 1852 a ship arrived from England with five cases on board, and the affected families were landed in quarantine. The disease then continued in sporadic form for a number of years, but in 1865 it once more increased in incidence to reach a maximum in 1869, when several deaths occurred. Another epidemic occurred in 1873. Thereafter, the recorded mortality from the disease fluctuated irregularly—

1907 (103 deaths)
1921 (58 deaths)
1936 (51 deaths), and
1942 (32 deaths)

being conspicuous years. Since 1942, however, Whooping Cough has been responsible for few deaths in Western Australia, although the natural history of the disease suggests that another epidemic may occur at any time.

To sum up, the following features in relation to this disease are pertinent :—

- 1. Whooping Cough was one of the first communicable diseases to be introduced into Western Australia (1833).
- 2. Three very considerable epidemics occurred in the early history of the State (1848, 1873 and 1886).
- 3. Since 1887 mortality from the disease has varied irregularly but has remained at a comparatively low level.
- 4. The mortality rate shows a cyclic pattern with peaks separated by intervals of 3–8 years (average about 4½).
- 5. Since 1942 the mortality from the disease has been negligible.
- 6. Over 95 per cent. of all deaths have been in children under the age of 5 years.
- 7. Approximately one-quarter of all deaths have occurred during the months of January and February.

The measures of attempted prevention or control which have been in operation for many years past have hinged upon isolation of the patient or at least exclusion from school. It is unlikely that this procedure has contributed appreciably to the decline in mortality statistics. It is now well known that by the time the “whoop” develops or, in other words, by the time the disease can be confidently diagnosed on clinical grounds, maximum infectivity has passed and disease becomes non-infective soon afterwards. The decline in mortality, on the other hand, is probably attributable to the general factors which have reduced the prevalence of the other communicable diseases, *i.e.*, smaller families, less overcrowding, better nutrition, and a higher standard of living. Artificial immunisation has not been completely successful but improved vaccines hold out the best hope for prevention in the future.

Western Australia—Whooping Cough.

“Whooping Cough has never been made notifiable in Western Australia” (1).

Year.	Mean Calendar Population.	Number of Deaths.	Death- Rate per 100,000.	Year.	Mean Calendar Population.	Number of Deaths.	Death- Rate per 100,000.
1833	1,582†	1	63·21	1862	16,806	1	5·95
1848	4,669†	15	321·26	1863	18,544	....	....
1853	9,022†	....	....	1864	19,888	....	....
1854	10,543†	4	37·94	1865	20,872	9	43·12
1855	12,174†	1	8·21	1866	21,876	....	....
1856	12,881†	1	7·76	1867	22,759	....	....
1857	13,263†	3	22·62	1868	23,720	5	21·08
1858	13,955†	1	7·16	1869	24,473	16	65·37
1859	14,690†	....	....	1870	24,894	1	4·02
1860	15,092	....	....	1871	25,291	....	....
1861	15,641	....	....	1872	25,652	....	....

Western Australia—Whooping Cough—continued.

Year.	Mean Calendar Population.	Number of Deaths.	Death- Rate per 100,000.	Year.	Mean Calendar Population.	Number of Deaths.	Death- Rate per 100,000.
1873	25,904	55	212·32	1912	301,040	10	3·32
1874	26,204	13	49·61	1913	313,383	20	6·38
1875	26,729	....	....	1914	322,668	20	6·19
1876	27,338	....	....	1915	321,247	7	2·14
1877	27,958	....	....	1916	313,066	28	8·99
1878	28,427	....	....	1917	306,339	25	8·16
1879	28,876	....	....	1918	308,198	17	5·51
1880	29,350	....	....	1919	319,955	9	2·81
1881	29,859	15	50·23	1920	330,023	....	....
1882	30,586	....	....	1921	334,084	58	17·36
1883	31,551	....	....	1922	341,375	13	3·80
1884	32,816	1	3·04	1923	350,772	5*	1·42
1885	34,753	3	8·63	1924	363,152	24	6·60
1886	38,282	61	159·34	1925	372,970	15	4·02
1887	42,212	4	9·47	1926	380,930	19	4·98
1888	43,817	....	....	1927	392,071	24	6·12
1889	44,737	....	....	1928	407,576	7	1·72
1890	47,081	....	....	1929	420,756	18	4·27
1891	50,840	19	37·37	1930	429,079	11	2·56
1892	55,873	13	23·26	1931	432,347	10	2·31
1893	61,746	....	....	1932	435,041	38	8·73
1894	73,251	4	5·46	1933	438,780	13	2·96
1895	91,047	21	23·06	1934	442,354	1	0·22
1896	118,666	9	7·58	1935	446,874	4	0·89
1897	148,656	3	2·01	1936	452,294	51	11·27
1898	163,687	8	4·88	1937	457,328	8	1·74
1899	168,568	29	17·20	1938	463,808	1	0·21
1900	175,113	31	17·70	1939	469,780	35	7·45
1901	188,135	13	6·91	1940	473,397	9	1·90
1902	204,705	23	11·23	1941	473,988	1	0·21
1903	219,643	42	19·12	1942	476,619	32	6·71
1904	233,963	17	7·26	1943	476,745	6	1·25
1905	246,681	1	0·40	1944	481,498	1	0·20
1906	254,362	11	4·32	1945	487,510	4	0·82
1907	255,510	103	40·31	1946	492,771	1	0·20
1908	257,822	20	7·75	1947	502,978	8	1·58
1909	263,279	3	1·14	1948	514,843	....	....
1910	271,019	55	20·29	1949	533,083	2	0·37
1911	286,712	13	4·53	1950	558,709	11	1·97

* Listed as 4 by Cumpston, but 5 in Statistical Register 1923.

† See below : Not true “ Mean Calendar Population ” but arithmetical average.

Sources.

Mean calendar population figures 1860–1949 “ Commonwealth Demography 1949.”
Numbers of deaths, 1833–1896. Cumpston, J. H. L. (1).
Numbers of deaths, 1897–1911. W.A. Statistical Register, 1911.
Numbers of deaths, 1911–1949. W.A. Statistical Registers and Annual Reports, Commissioner of Public Health.

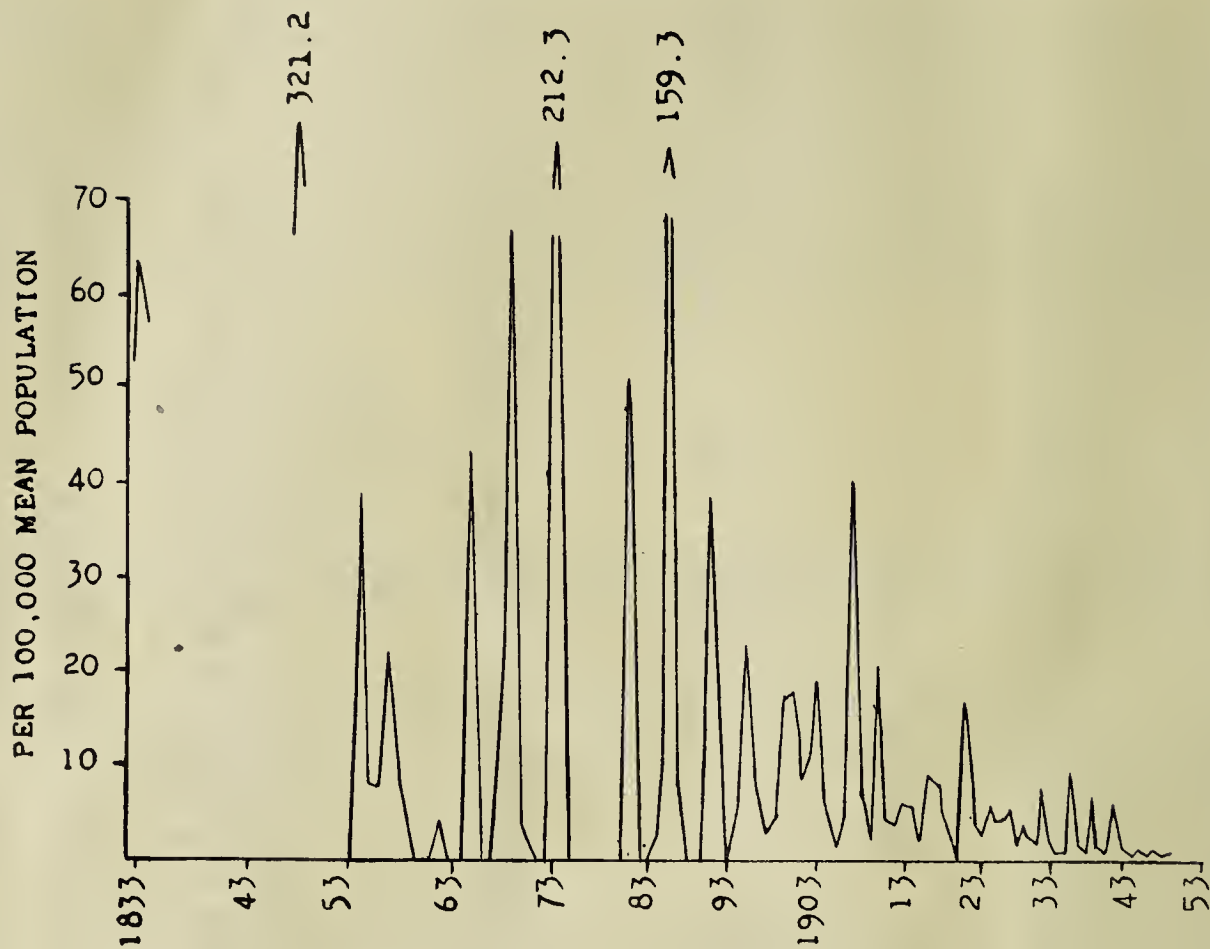
Mean Calendar Population 1950 : calculated.

“ Mean Calendar Population ” 1833–1859 are arithmetical averages of populations as at 31st December in year listed and previous year. Figures for populations of 31st December from “ Commonwealth Demography 1949.”

References.

1. Cumpston, J. H. L. “ History of Diphtheria, Scarlet Fever, Measles and Whooping Cough in Australia,” 1927. Commonwealth Department of Health.

WHOOPING COUGH - WESTERN AUSTRALIA - 1833-1951
MORTALITY RATE



VI. MEASLES (1828-1951).

Measles was introduced into Western Australia in 1860, and resulted in nine deaths during that year (Cumpston, 1927). An epidemic with 48 deaths followed during the ensuing year. There was then a twenty-two year period of apparent freedom because it is stated that “with the exception of one single death in 1880, no deaths from measles are recorded in Western Australia till 1883, when another explosive outbreak occurred. Thirty deaths were recorded in that year, 95 the following year, and 4 in 1885.” The 1883 epidemic is said to have disorganised the daily routine of life in Perth owing to absenteeism among tradesmen, public servants, shopkeepers, and the like. It is believed that this epidemic was introduced from the Eastern States through Albany. The epidemic excited both professional and public comment. Reference was made to the severity of the disease in adults and to broncho-pneumonia as a complication ; while public concern led to the introduction of an amendment to an Act to provide for “regulations of sufficient scope to check the spread of contagious or infectious disease . . .”

Another period of freedom ensued until 1893, when a third epidemic overtook the community and accounted for 21 deaths. The subsequent mortality from the disease indicates that it then prevailed more or less continuously for thirty years, but was a conspicuous cause of death in the years 1898, 1901, 1908, 1911, 1915, 1921 and 1924.

The mortality record has been brought up to date by abstracting relevant data from the Statistical Registers for Western Australia for the years 1924-1949 ; while for 1950 and 1951 figures have been obtained directly from the Government Statistician. It will be seen that mortality from this disease has been capricious with death-free periods of irregular duration. This is not in conformity with experience elsewhere, which suggests that measles recurs more or less regularly every alternate year.

A glance at Figure I., which sets out the death rate for measles for the period 1860-1951 shows that although the rate of mortality from this disease has shown a steady downward trend, it still accounts for a significant number of deaths at irregular intervals, which vary from three to seven years.

Fig. I. Measles—Western Australia—Death Rate.

(Per 100,000 mean population.)

Year.	Deaths.	Mean Pop'n. (1,000's)	Death Rate.	Year.	Deaths.	Mean Pop'n. (1,000's)	Death Rate.
1860	9	15	60.0	1866	....	22	....
1861	48	16	300.0	1867	....	23	....
1862	....	17	....	1868	....	24	....
1863	....	19	....	1869	....	24	....
1864	....	20	....	1870	....	25	....
1865	....	21	....	1871	....	25	....

Fig. I. Measles—Western Australia—Death Rate—continued.

Year.	Deaths.	Mean Pop'n. (1,000's)	Death Rate.	Year.	Deaths.	Mean Pop'n. (1,000's)	Death Rate.
1872	....	26	....	1912	....	301	....
1873	....	26	....	1913	9	313	2.9
1874	....	26	....	1914	6	323	1.8
1875	....	27	....	1915	20	321	6.2
1876	....	27	....	1916	16	313	5.1
1877	....	28	....	1917	13	306	4.2
1878	....	28	....	1918	3	308	0.9
1879	....	29	....	1919	....	320	....
1880	1	29	3.4	1920	17	330	5.1
1881	....	30	....	1921	24	334	7.2
1882	....	31	....	1922	2	341	0.6
1883	30	32	93.8	1923	1	351	0.3
1884	95	33	287.9	1924	38	363	10.4
1885	4	35	11.4	1925	....	373	....
1886	....	38	....	1926	....	381	....
1887	....	42	....	1927	....	392	....
1888	....	44	....	1928	3	408	0.8
1889	....	45	....	1929	18	421	4.3
1890	....	47	....	1930	1	429	0.2
1891	....	51	....	1931	....	432	....
1892	....	56	....	1932	....	435	....
1893	21	62	33.9	1933	....	439	....
1894	?	73	?	1934	....	442	....
1895	....	91	....	1935	18	447	4.0
1896	....	119	....	1936	1	452	0.2
1897	1	149	0.7	1937	....	457	....
1898	34	164	20.7	1938	....	464	....
1899	5	169	2.9	1939	1	470	0.2
1900	1	176	0.6	1940	29	473	6.1
1901	45	188	23.9	1941	....	474	....
1902	19	205	9.2	1942	11	477	2.3
1903	3	220	1.4	1943	5	477	1.0
1904	1	234	0.4	1944	....	481	....
1905	1	247	0.4	1945	....	487	....
1906	5	254	1.9	1946	30	493	6.0
1907	6	256	2.3	1947	....	503	....
1908	27	258	10.5	1948	1	515	0.2
1909	9	263	3.4	1949	9	533	1.7
1910	2	271	0.7	1950	6	559	1.0
1911	19	287	6.6	1951	4	581	0.7

The seasonal incidence of measles in Western Australia during the period 1899–1924 is indicated by the relative proportion of total deaths occurring during each of the twelve months in a year. Unfortunately, no such data is readily available for the period subsequent to 1924. The table hereunder shows that rather more deaths take place during the latter half of the year (approximately 68 per cent.) than during the first half (approximately 32 per cent.) ; and that August, September, and December are “ bad ” months.

Measles—Western Australia—1899–1924.
Percentage of Deaths by Months (from Cumpston, 1927).

Month.	Deaths.	Percentage.
January	24	8.2
February	24	8.2
March	4	1.3
April	7	2.7
May	13	4.4
June	22	7.5
July	29	9.9
August	30	10.3
September	40	13.6
October	28	9.6
November	29	9.9
December	42	14.4
	292	100.0

As the disease is not notifiable, it is not possible to present useful data to indicate its seasonal prevalence, as opposed to its mortality. Admissions for measles to the Infectious Diseases Hospital, Subiaco, for the years 1944–1952, would give some idea of the trend in recent years.

Measles—Admissions to Infectious Diseases Branch.

	1943.	1944.	1945.	1946.	1947.	1948.	1949.	1950.	1951.	1952.	Total.
January	14	3	....	7	1	....	6	4	7	2	44
February	4	....	....	19	....	....	2	....	2	....	27
March ....	....	....	....	60	1	....	....	1	2	....	64
April ....	....	....	....	71	1	....	3	....	....	....	75
May ....	....	....	....	78	....	....	5	....	1	....	84
June ....	....	....	....	47	2	....	11	1	1	1	63
July ....	....	....	....	26	....	....	10	2	10	1	49
August	7	....	....	11	....	1	5	....	13	2	39
September	2	....	....	4	1	....	13	....	14	....	34
October	5	....	....	4	....	7	28	1	19	....	64
November	3	....	....	3	....	4	10	....	8	....	28
December	5	....	1	2	....	2	7	1	3	....	20
	40	3	1	332	6	14	100	9	80	6	591

Appendix XI.

ARGENTINE ANT CONTROL.

The Commissioner of Public Health.

I submit herewith a report on Argentine Ant control activities during the period 1st July, 1952, to 30th June, 1953.

This report gives a brief summary of the control measures and a more detailed account of a spraying campaign to eradicate Argentine ants from approximately one square mile of the thirty square miles infested in this State.

An analysis of costs and spraying data prepared by Mr. A. C. Waldon is appended.

CONTROL.

This campaign was conducted on similar lines to previous years.

D.D.T. and mobile power sprays were supplied free of charge, and the wages of three men per spray unit were recouped to all local authorities for the treatment of the perimeter of infested areas and other public property requiring urgent attention.

A total of 2,390 gallons of 20 per cent. D.D.T. emulsion were supplied and wages recoups amounted to £2,810.

In addition, 3,783 quarter gallon tins of 20 per cent. D.D.T. emulsion, 1,475 one pound tins of 50 per cent. D.D.T. emulsifiable concentrate and 10,242 eight ounce bottles of ant bait were supplied at cost for resale to the public through local government offices.

ERADICATION.

During the past two years experimental work by the C.S.I.R.O. and Departments of Agriculture in Western Australia and New South Wales has shown that, using chlordane and other powerful insecticides, it was possible to eradicate Argentine ants from small suburban areas.

This work was submitted to a conference of State Entomologists, in Canberra during June, 1952. After examination of the experimental evidence, a resolution was passed from which the following extracts have been taken :—

“ Possibility of Eradication.

Certain habits of the Argentine ant make it an unusually favourable subject for eradication. These are :—

1. Where Argentine ants are established they become numerous and very obvious.
2. The steady expansion of existing areas of infestation is easily observed. It is thus easy to determine the limits of each infestation.
3. Flying swarms are rarely produced, so unlike most other insect pests it spreads by means of trails.
4. Within the infested areas the queens as well as the workers may move about freely. Consequently, efficient results can be achieved without treating each individual nest.
5. Their shallow nesting habits make them susceptible to surface treatment with insecticides such as chlordane.

By taking advantage of these favourable habits and by using modern persistent contact insecticides, it has been found possible to clear experimental areas of Argentine ants at relatively small cost. . . .”

“ We cannot expect such small scale experiments to provide any more conclusive evidence ; the next step should be to institute an actual eradication campaign.

Even if the test eradication is not immediately successful it is quite certain that the control of ants achieved by such campaigns will virtually eliminate the ants from the areas, treated, and so greatly reduce the possibility of spread to new areas.”

Acting on this advice the Government decided to attempt large scale eradication in addition to the usual control methods used during the past two years.

Enabling legislation was passed by Parliament and two areas were selected for the trials.

1. A section of a larger infestation at South Perth ; one portion to be sprayed twice during the summer and the second portion once. The acreage to be covered was not strictly defined ; the extent depended almost entirely on the rate of progress of the spraying teams.

This area was also to be used to assess the possibility of preventing reinfestation.

2. An isolated area of 128 acres at Bunbury.

Entomological surveys both before and after treatment were carried out by entomologists of the Department of Agriculture.

Equipment.

The spray unit used at South Perth was a Moffat Virtue double action roller pump powered by a 1 h.p. petrol motor, obtained as a complete unit. This was clamped on top of a cut-down 44 gallon drum capable of comfortably holding 20 gallons, which was mounted on a three-wheel trolley fitted with 16 in. x 4 in. pneumatic tyres. The overall width of the trolley was 2 ft. 6 in. to allow easy movement through small household gates. (Fig. 1).

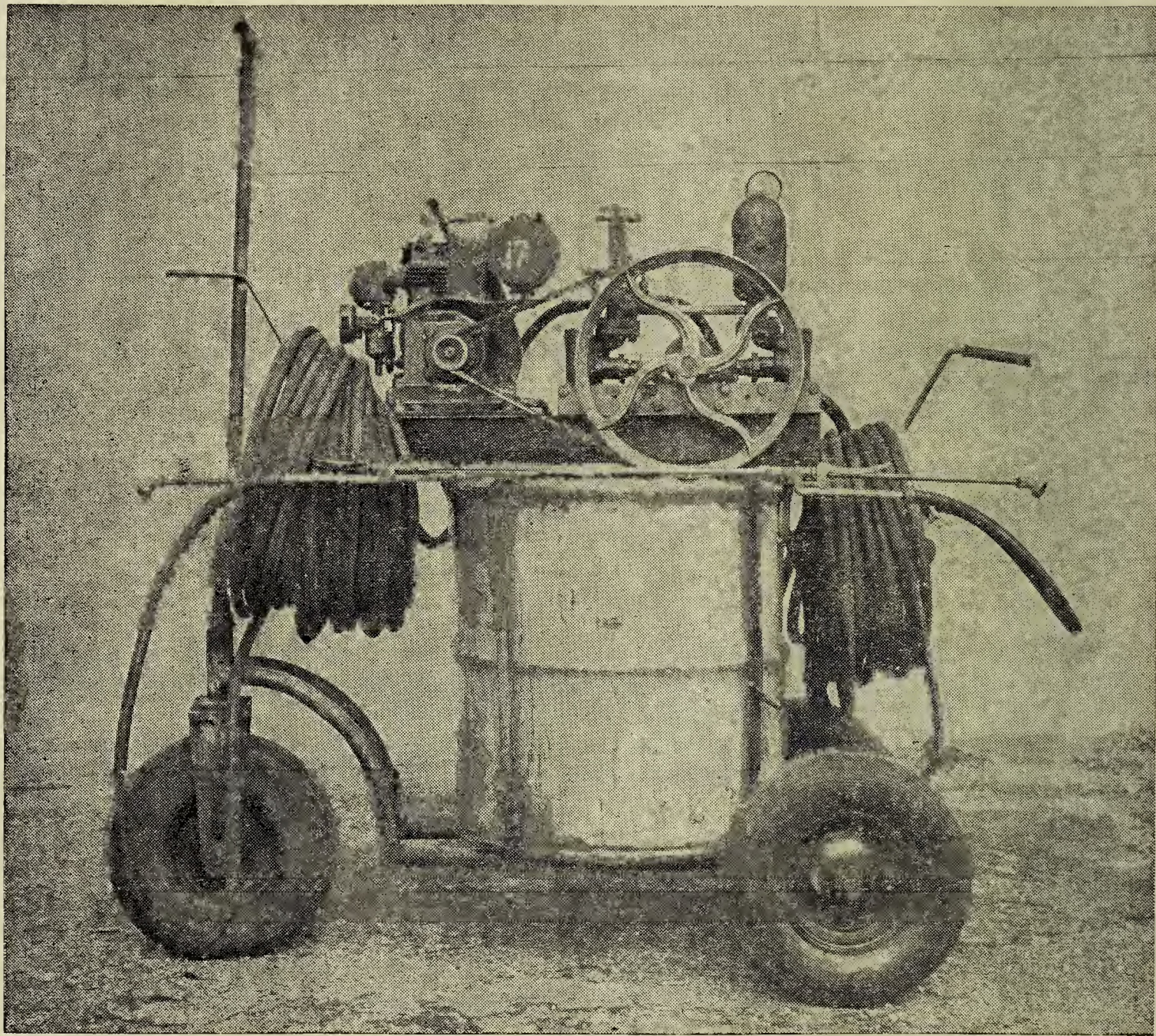


Figure 1.

Each pump was equipped with two 100 ft. lengths of $\frac{3}{8}$ in. bore hose and fitted with spray lances having hand grip type release valves and single 45° angle, cyclone nozzles. As the output from these nozzles was found to be too great for our purpose the standard face disc was replaced with one having a smaller aperture $\frac{3}{16}$ in. in diameter.

Where dense foliage or rank grass was encountered and it was necessary to get greater penetration, the nozzles were replaced by straight jets of $\frac{3}{32}$ in. diameter aperture.

With the pump adjusted to a working pressure of 150 lb., the output of 20 gallons through the two lances took :—

$\frac{3}{16}$ in. diameter nozzles	....	....	31 minutes.
$\frac{3}{32}$ in. diameter jets	....	....	11 minutes.

Five mobile power sprays were used in the South Perth experimental area ; while a sixth unit was made available to the State Gardens Board for the treatment of the Zoological Gardens which were situated within the area to be treated.

Three men operated each unit ; two men using the spray lances while the third looked after the pump, moved the plant as required and assisted with the manipulation of the long length of hose.

Insecticide.

A chlordane concentrate prepared to the following formula was used in all treated areas :—

Chlordane (Agricultural Grade)	....	....	1 pint (2 lb.)
*C.M. 526 (Non-ionic emulsifier)	....	....	5 fl. oz.
Lighting Kerosene	....	....	5 fl. oz.

* Supplied by Chemical Materials Pty., Ltd., Glebe, N.S.W.

One and a half pints of this concentrate made up to 10 gallons with water gave a 2 per cent. weight / weight emulsion which remained stable for months, although in practice freshly prepared spray was always used.

Premixing of the concentrate by the gradual addition of approximately half a gallon of water with thorough agitation gave best results.

The effect of this spray on vegetation was slight. Apart from some damage to ferns and other tender plants which occurred when the spraying of these was unavoidable, and a temporary yellowing of lawns in the sprayed strips (particularly on hot days), no harm resulted from the spray application.

Spraying Procedure.

The method adopted was that used by Forte and Greaves in their experimental work at Subiaco—reported in the Journal of Agriculture of Western Australia, Vol. 2, March-April, 1953. It has been summarised in the following extracts from an “Instruction to Spray Hands.”

SPRAYING TWO PER CENT. CHLORDANE FOR ARGENTINE ANT CONTROL. PROTECTION OF OPERATOR OR SPRAYER.

Although considered to be more toxic than D.D.T., chlordane can be used with little risk to the operator if some elementary precautions are observed. These are as follows :—

- (a) No parts of the body should be unnecessarily exposed. In other words, overalls or long trousers must be worn and a hat. On no account wear shorts.
- (b) Protect hands by using the barrier cream supplied. This assists in preventing penetration of the chlordane through the skin.
- (c) Avoid all contact of the concentrated chlordane with the skin. If this occurs without barrier cream being present on the part concerned, wash it with soap and water as soon as possible.
- (d) Avoid spraying up in the air or into the wind if there is a chance of spray contacting you.
- (e) Do not smoke while spraying.

PROTECTION OF HOUSEHOLDER'S INTERESTS.

It is necessary to observe the following points when spraying to avoid any objection or loss on the part of the householder :—

(a) *Gold fish.*

As chlordane is almost as toxic to fish as D.D.T., cover Gold fish ponds with bags and spray carefully and sparingly around them.

(b) *Pets.*

Avoid spraying pets' food and feeding bowls ; the latter should be turned upside down.

(c) *Children's Toys.*

Children's playthings should be picked up and on no account sprayed with Chlordane.

(d) *Poultry.*

When spraying poultry yards turn over water and food dishes and do not allow spray to contact the birds unnecessarily.

(e) *Fruit.*

Where grapes are present on vines or fruit on trees avoid spraying the fruit as much as possible. The householder should be advised to wash all fruit carefully before eating.

(f) *Vegetables.*

When spraying vegetable gardens avoid spraying those parts of the plant which are eaten, for example, lettuce, spinach, tomato fruits, etc. Unless the beds are extensive, the ants should be controlled by spraying the edges of the beds.

SPRAYING PROCEDURE.

During spraying the spray lance is held ahead of the operator and about six inches above the ground. This gives a forceful penetration and a band or barrier of chlordane about six inches wide. A medium walking pace will be found about the right speed for the correct application.

PLACES TO SPRAY.

It is not necessary to spray inside with chlordane, but the following places outside should be thoroughly treated :—

- (a) Spray the base of the fence all around the block and the rails of same if they face into the block. This includes the front fence also.
- (b) Spray the foundations of the house at ground level and the line of contact of the bricks and the foundations, and ventilators. In the case of a weatherboard house, spray the outside stumps all around—the plinth board and around steps leading to the house.
- (c) Spray thoroughly all other contact points with the house, for example, lattices, trees touching the house, steps, etc.
- (d) Spray the edges of the garden beds, the edges of the paths. Lawns should be treated by spraying barriers across them at intervals of 10 feet in both directions.
- (e) *Trees*.—These should be sprayed very thoroughly from ground level to the lower limbs or at least to a height of 6 feet.
- (f) *Grape vines* need careful attention as the ants invariably make nests in them. But care must be taken if bunches of grapes are present.
- (g) Spray pot plants and hanging baskets carefully.

These methods were used throughout the built up area, but where dense vegetation was encountered, as in some vacant blocks and in the Market Garden section, a complete cover spray was used and as previously mentioned, jets were used in place of the spray nozzles.

For the purpose of this report, the treated area at South Perth has been divided into four sections. They are :—

1. Double sprayed area extending from Mill Point to South Terrace and Coode Street, area 331 acres.
2. The Zoological Gardens.
3. The single sprayed area of 165 acres extending from South Terrace to Saunders Street.
4. The abandoned market garden land between Mill Point Road and the river foreshore terminating at Coode Street, area 48 acres. (Fig. 2).

Inspections were made of all premises to be treated and where necessary orders were served to clear fence lines, remove rank vegetation and clear rubbish ; for although it had been shown that chlordane could be used effectively without clearing, it was considered that, apart from ensuring more effective treatment, there would be a considerable saving in the quantity of insecticide used when clearing up was done.

This is borne out by the following figures :—

1. Vacant lot heavily overgrown with grass and bush required 90 gallons of spray to treat $\frac{1}{4}$ acre. (Fig. 3).
2. A dwelling occupied by two old-age pensioners, backyard badly overgrown required 50 gallons per $\frac{1}{4}$ acre. (Fig. 4).
3. A suburban home with well kept but elaborate garden layout—30 gallons. (Fig. 5).
4. A clean suburban dwelling with well kept garden—15 gallons. (Fig. 6).

A total of 163 orders for clearing were served and in nearly all cases genuine attempts were made to comply with the requirements of the order. There were exceptions such as old-age pensioners who were physically incapable of doing the work and could not afford to pay for it to be done ; also absentee owners of vacant land who could not be reached in time.

A notice left at every house after treatment is shown hereunder :—

“ TO THE OCCUPIER :

ARGENTINE ANT ERADICATION.

As part of a large scale campaign to eradicate Argentine ants, your premises have been thoroughly sprayed with an insecticide which, given reasonable assistance, will remain an active destructive agent against ants for many months.

Many of the ants have already been destroyed, but there are more under cover, as yet unaffected, which must be killed.

The residual film of insecticide now covering the sprayed areas will destroy ants as they emerge for food, therefore it should be left undisturbed for as long as possible.

You are requested not to water for at least twenty-four hours, or to turn over the soil within a fortnight. Top dressing or work of a similar nature should be avoided altogether for this season.

Should Argentine ants reappear on your property, or should they be introduced on wood, manure, pot plants or merchandise, you are asked to report the occurrence to the Local Authority immediately.

Your full co-operation in this work will not only assist this Department, but will benefit yourself and be a service to the whole community.”

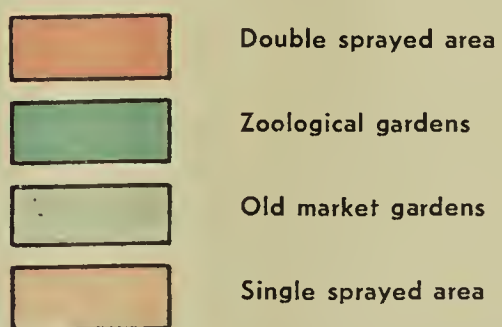
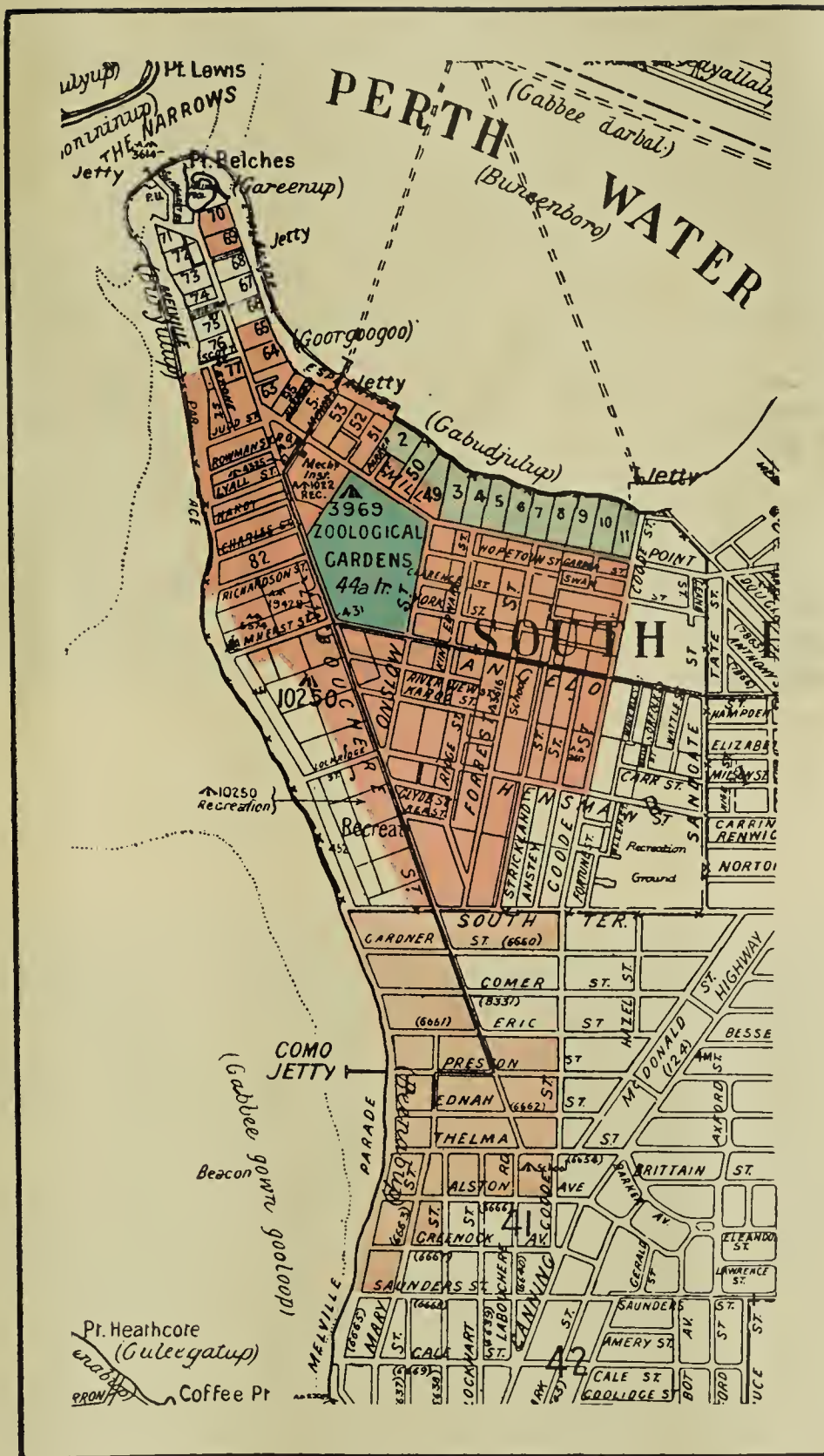


FIGURE 2

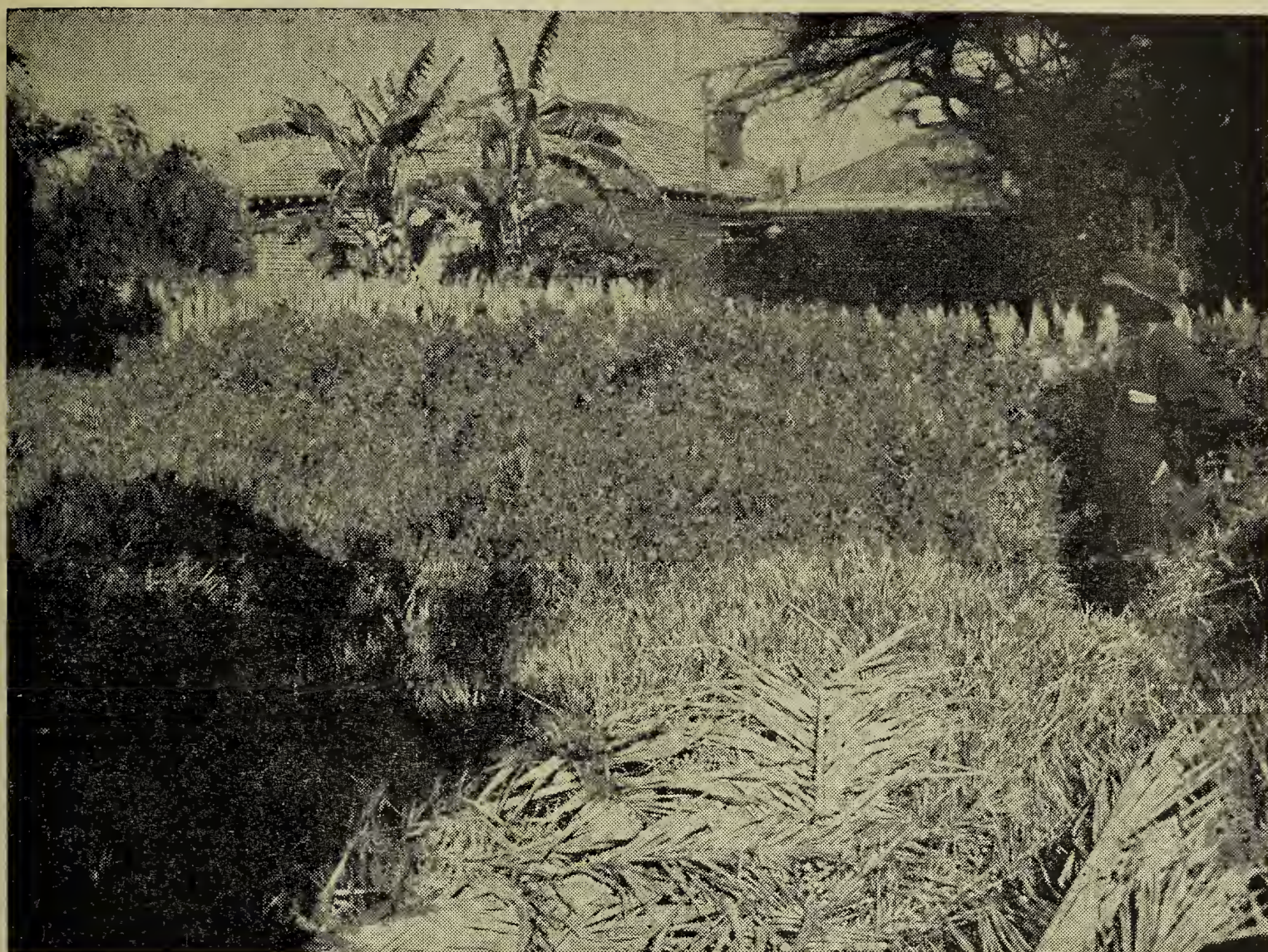


Figure 3.



Figure 4.

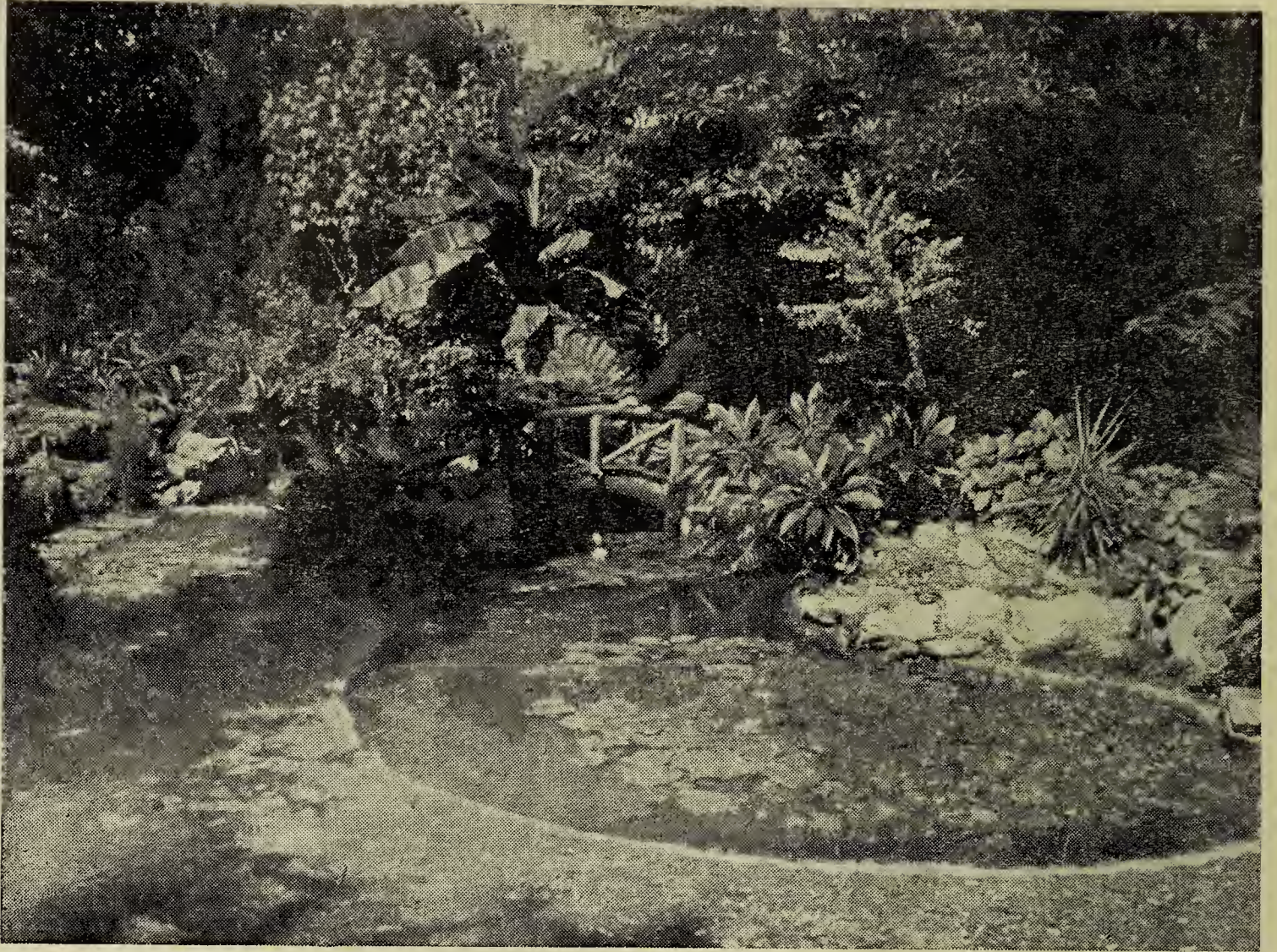


Figure 5.

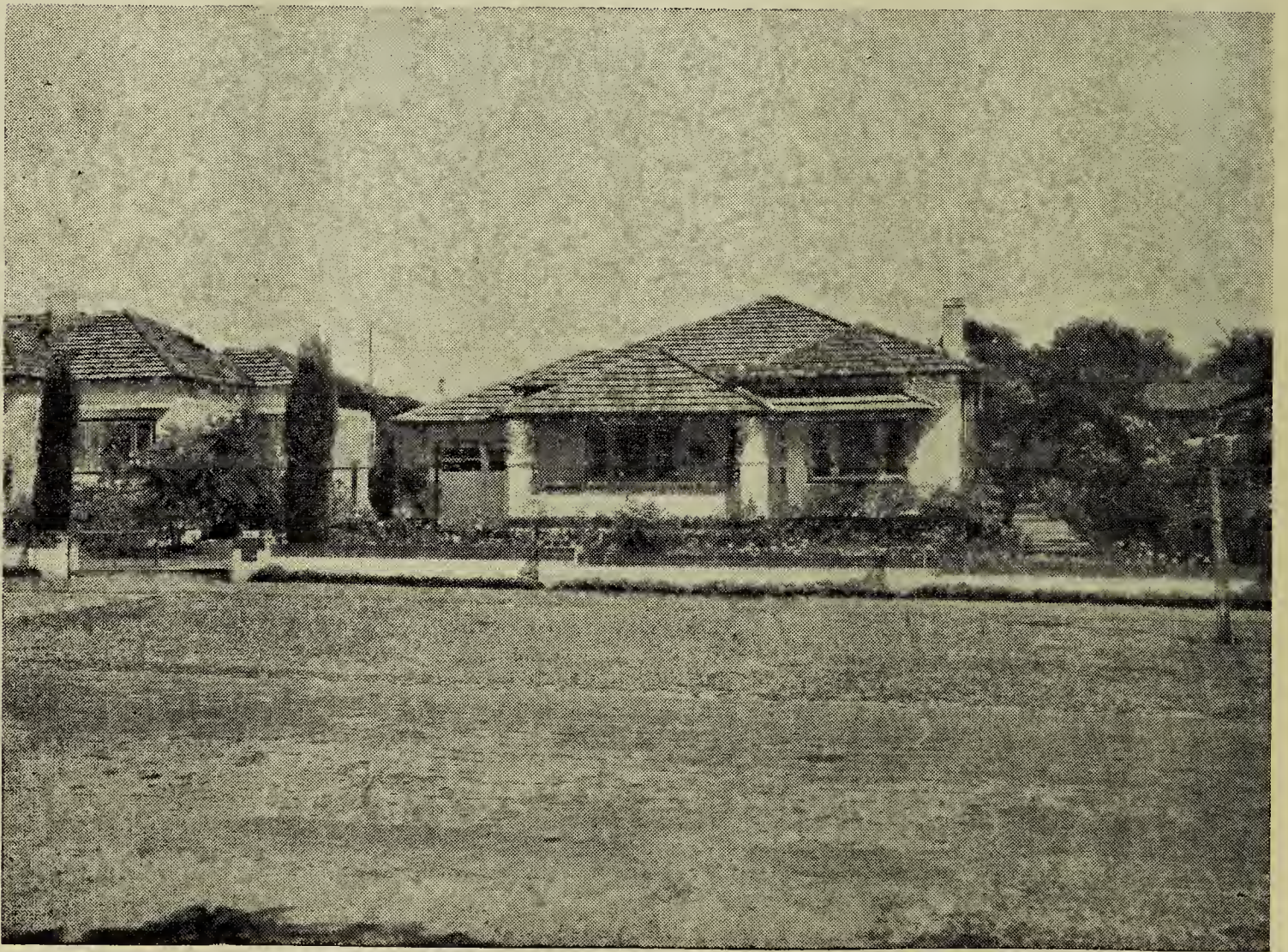


Figure 6.

Double Sprayed Area.

The first spraying of this section was commenced on the 8th December, 1952, and completed on 6th February, 1953. Four thousand one hundred and sixty-six man-hours were taken to apply 22,385 gallons of spray. Progress was slow to begin with but as the men became experienced and familiar with the work, the rate of progress increased and the second spray was applied between 6th February and 19th March, and it took 3,240 man-hours to apply 19,340 gallons. The rates of application were, first spray, 67·6 gallons per acre ; second spray 58·4 gallons per acre.

The area treated included :—

Dwellings	....	....	....	852
Vacant blocks	....	....	....	48
Schools	....	....	....	3
Churches	....	....	....	3
Convents	....	....	....	1
Hotels	....	....	....	1
Park Lanes	....	....	....	4
Golf Links	....	....	....	1
Tennis Courts	....	....	....	24
Bowling Greens	....	....	....	1

and all adjoining street verges, footpaths, right-of-ways and sections of the river foreshore.

The double spray treatment was recommended for large scale eradication trials because it was felt that the second treatment would be necessary to ensure complete coverage with the insecticide. This view appears to have been justified as, in the entomological survey made after the first spray it was found that trees, shrubs, and various other locations had been missed by the team. However, most of these mistakes occurred in the early days of the campaign and could be attributable to inexperience and also to unsuitable personnel who were gradually weeded out.

Zoological Gardens.

This area situated within the double treated section presented special difficulties owing to the animals present, the nature of their enclosures and other factors peculiar to such places.

By arrangement with the State Gardens Board this work was undertaken by the Curator, Mr. Lyall and his staff under the supervision of the Senior Entomologist, Mr. P. N. Forte. Insecticide and power spray were supplied by this Department.

The Department is sincerely grateful to the State Gardens Board and Mr. Lyall for their whole-hearted co-operation.

Single Sprayed Area.

One hundred and sixty-five acres were treated between 20th March and 8th April, 1953. Eight thousand one hundred and ten gallons of spray were applied at the rate of 49·1 gallons per acre in 1,368 man-hours.

The treatment of this area was undertaken to estimate the value of a single spray application by experienced workers and this factor of experienced men will have to be taken into account when the results are finally assessed.

Old Market Gardens.

This land covering 48 acres extending from near Mends Street Jetty to Coode Street and from the river foreshore to Mill Point Road presented many treatment difficulties.

This market garden land had been abandoned for some time, consequently it was heavily overgrown with vegetation of all kinds and parts were permanently covered with water ; these latter areas supported a dense growth of bulrushes. The old irrigation ditches and a deep drain which separated the reed and paper-bark covered foreshore from the garden land made even the movement of hand trolleys difficult and sometimes impossible. (Figs. 7-11).

Clearing by either manual or chemical means was impracticable and uneconomic and there was little chance of successfully burning the area, although treatment was deferred until late in the summer in the hope that this could be done.

All water for the insecticide had to be carted to the spot.

Taking into account the dense vegetation plus the fact the area was very heavily infested with ants, it was decided to apply a heavy application of ehlordane as a complete cover spray.

The South Perth Road Board co-operated by bulldozing a track from the Mends Street Jetty end to the junction of Mill Point Road and King Edward Street and by clearing narrow tracks from Mill Point Road to the foreshore in areas where the vegetation was particularly dense.

Two spray units were used ; each equipped with one 100 ft. and one 300 ft. length of spray hose. One unit sprayed the foreshore area while the other treated the section between the deep drain and the road.

Water for the foreshore unit was pumped through 700 ft. of hose by a third power spray adapted for this purpose.

The whole area was treated in strips and paper markers were used to ensure thorough coverage.

The spraying was completed in three weeks and 14,060 gallons of spray were applied at 292·9 gallons per acre,



Figure 7.



Figure 8.



Figure 9.



Figure 10.



Figure 11.

Bunbury.

The treatment of this area of 128 acres was carried out by the Bunbury Municipal Council with spray labour wages, one power spray and insecticide provided by this Department. The spraying was supervised by Inspector F. Thrum under the direction of the Entomological Branch of the Department of Agriculture.

This was a double spray treatment ; 11,020 gallons of spray were used at a rate of 86.1 gallons per acre.

In addition to these large scale campaigns, three small areas of infestation at Manjimup ($1\frac{1}{2}$ acres), Cranbrook ($2\frac{3}{4}$ acres) and Kelmscott (3 acres) have been treated with chlordane.

Results.

Reports of ant re-appearance were fairly frequent up to four weeks after treatment but after that period notifications were rare. Inspections made of sprayed areas three months later, seemed to indicate that the Argentine ant had been virtually eliminated.

However, the final evaluation of this work will not be known until next summer when further surveys are made by entomologists of the Department of Agriculture.

Several reports of the introduction of Argentine ants on lettuce, wood, manure and pot plants were received. On investigation, it was found that, in most instances, the householder had taken suitable measures to prevent re-infestation.

From a public health viewpoint it is worth while recording that in all sprayed areas, there was a noticeable reduction in both fly and mosquito populations which lasted for some months after treatment.

In contrast to the effectiveness of large scale spraying, the treatment of several individual household lots in other parts of the metropolitan area did not give uniform and lasting results ; re-infestation through fences from adjoining properties commonly occurred within three months.

The total area treated at South Perth and Bunbury was 672 acres. The twice sprayed area covered 459 acres and the single sprayed area 213 acres.

The cost of treatment was £11,063, exclusive of administrative and entomological survey expenses.

It will be seen from these figures and those contained in the appended table that the original estimated cost of £15,000 per square mile is still reasonably accurate for a campaign which envisages a double spray treatment of the infested areas.

Allowing for some extension of the known infestation of 30 square miles and for possible spot spraying after the initial treatments, the total cost of eradication would be approximately £500,000.

Although of little public health significance the Argentine ant can be a serious domestic pest and it has been shown that efforts to control or eradicate it by individual householders are more expensive and less effective than a co-ordinated treatment over large areas.

To finance such large scale treatment it was proposed that an " Ant Rate " should be struck in the metropolitan area and other infested districts for a period of five years. This was also the estimated time in which eradication could be effected.

The proposed " Ant Rate " has been estimated at approximately 14s. per annum for an average household block with an unimproved capital value of £200 or an annual rental value of £50, a sum far less than the amount spent annually by the majority of householders on Argentine ant control.

It is unfortunate that the consideration of this plan had to be deferred until the South Perth and Bunbury experiments were finally examined, as there is now little likelihood of obtaining sufficient funds for the continuation of the eradication campaign next summer.

If it is intended to continue this work, then the following work must be undertaken to keep future expenditure within reasonable bounds.

- (a) Prevent the re-infestation of the areas already cleared at South Perth and Bunbury.
- (b) Effectively prevent the spread of ants from infested market gardens, nurseries and wood yards, etc.
- (c) Provide immediate control of new, small isolated infestations as they occur before they assume large proportions.

Active steps have already been taken to prevent the transport of ants in merchandise ; 25 wood yards and two manure depots have been successfully treated with chlordane. Also a plan to prevent ants being removed in produce from market gardens has been worked out by the Department of Agriculture. This latter plan is estimated to cost approximately £6,000.

ACKNOWLEDGMENTS.

The Department's thanks are due to Mr. J. A. Fowler for his very able supervision of the spraying teams at South Perth ; to the Bunbury Council and Inspector F. Thrum, who conducted the Bunbury experiment ; to Inspector I. McNabb and Mr. J. R. Knott of the South Perth Road Board for their practical assistance, and to the householders in the treated areas for their co-operation.

Particular thanks are due to Mr. T. Greaves of the C.S.I.R.O. who freely gave us the benefit of his experience in similar work which was being done in Sydney.

C. E. FLOWER,
Deputy Chief Inspector.

SUMMARY.

Area Treated.	Acres.	Per cent. Area Sprayed.	Spray Used	Cost of Spray.		Spraying Time Man Hours.	Labour Cost.	Man Hours per Acre.	Gallons Spray per Acre.	Man Hours per Gallon in Minutes.	Spray and Labour.		Maintenance Depreciation Equipment.	Total Cost.		
				£	s. d.						£ s. d.	Cost per Acre.		Cost per Gallon.	£	s. d.	£	s. d.	Per Sq. Mile.	Per Gallon.
Double Area : 1st Spray 2nd Spray	331	%	gals.	£	s. d.		£			(mins.)	£ s. d.	£ s. d.		£	s. d.	s. d.
	331	38	22,385	1,613	19 2	4,166	1,872	12.6	67.6	11.16	10 10 7	3 1½	139 18 6	10 19 1	7,010 11 2	3 3
		38	19,340	1,394	8 3	3,240	1,456	9.8	58.4	9.96	8 12 3	2 11	123 13 6	8 19 8	5,750 8 0	3 0½
Total ....	....	76	41,725	3,008	7 5	7,406	3,328	22.4	126.0	10.62	19 2 10	3 0¼	263 12 0	19 18 9	12,760 19 2	3 2
Single Area Market Garden	165	19	8,110	584	14 7	1,368	615	8.2	49.1	10.08	7 5 5	2 11	50 14 0	7 11 7	4,849 18 5	3 1
	48	5	14,060	1,013	14 6	1,445	649	30.1	292.9	6.12	34 12 9	2 4½	70 18 0	36 2 4	23,114 17 1	2 5½
Total South Perth	875	100	63,895	4,606	16 6	10,219	4,592	....	....	9.54	....	2 10	385 4 0	....	....	3 0
Total Area Sprayed	875	...	....	....	....	....	....	11.6	....	....	10 10 3	....	....	10 19 1	7,010 11 2	....
Total Area Treated	544		....	....	....	....	....	18.7	....	....	16 18 2	....	....	17 12 4	11,274 17 7	....
Bunbury—Double Spray	128		11,020	794	3 8	1,880	685	14.6	86.1	10.2	11 11 1	2 8	....	....	....	....

NOTE.—South Perth area includes wages of a supervisor and depot storeman. Bunbury figures do not include such additional expense.

ARGENTINE ANT ERADICATION—SOUTH PERTH EXPERIMENTAL AREA.

Summary of Actual and Estimated Costs, Season 1952–53.

	Double Sprayed Area, 331 acres		Single Sprayed Area 165 acres	Chinese Gardens 48 acres		Total 875 acres.
	1st Spray.	2nd Spray.				
Insecticide (Chlordane)....	£. s. d. 1,613 19 2	£. s. d. 1,394 8 3	£. s. d. 584 14 7	£. s. d. 1,013 14 6	£. s. d. 4,606 16 6	
Wages	1,872 0 0	1,456 0 0	615 0 0	649 0 0	4,592 0 0	
Vehicles (Running Costs, Depreciation, etc.)	29 0 0	29 19 6	15 3 0	12 10 6	86 13 0	
Spray Units (Running Costs, Depreciation, etc)	89 14 0	76 12 6	28 16 6	51 13 0	246 16 0	
Personnel Equipment	21 4 6	17 1 6	6 14 6	6 14 6	51 15 0	
Total	3,625 17 8	2,974 1 9	1,250 8 7	1,773 12 6	9,584 0 6	

NOTE.—Average Cost per Acre $\frac{9,584}{875} = \text{£}10\ 19\text{s.}\ 1\text{d.}$ Single Spraying.

APPENDIX XII.
INFANT HEALTH.

The Commissioner of Public Health.

I have the honour to submit a report on Infant Health activities throughout Western Australia for the year ending 31st December, 1952.

The number of individual babies who attended Infant Health Centres throughout the State for the period under consideration was 23,952 as against 21,879 in 1951, and 20,075 in 1950. I think the increase numbers can be attributable to an increased birth rate and an increased number of migrant babies coming into the State, not so much to an increased interest in the service available, because it is estimated that the vast majority of mothers with babies already take full advantage of the service and attend more or less regularly.

Births reported to the Department for 1952 were 15,413, as against 14,794 for the previous year, showing an increase of 619 births for the period.

The total attendance at the Centres was 197,207. This figure shows an increase of 10,528 from the previous year when it was 186,679. This increased attendance has probably been brought about by the opening up of several new Centres during the year, making easier access to the Centres for the mothers concerned.

In addition to the above figures, must be added those of the Correspondence Nurse, who had on her roll 1,026 individual mothers and 211 expectant mothers in constant communication with her. These mothers, in addition, paid 404 individual visits to the sister and wrote in 2,412 letters.

Home Visits.

The visits paid by the Infant Health Sisters to the homes where babies are being reared is considered of the utmost importance, because in this way the Sister can see at first-hand the conditions under which the child is being brought up, and it is of great importance for the Sister to know this when giving advice and directions to the mother. Except in cases where there is a special need, only one visit is paid to the home and this as soon as possible after the mother comes from the Hospital with the new baby. The total number of such visits paid to infant homes was 18,644 compared with 19,795 for the previous year.

Telephones.

As in the past year, a considerable number of the Infant Health Centres, both in the country as well as the metropolitan area, have had the telephone installed. This has improved the service that we have been able to give to the mothers as, on wet days, mothers can then get advice from the Sister by telephone. Similarly in the case of infectious diseases, the mother can get the necessary advice from the Sister by telephone and does not risk carrying the infection to the Centre.

Advices given by telephone or letter (not including the Correspondence Scheme), total 5,066 as against 4,146 for the previous year.

Breast Feeding Returns.

While it appears that throughout Australia and the English speaking world that breast feeding is still on the decline, it has been always our concern to encourage and increase breast feeding throughout the State. Unfortunately, quietness, relaxation and freedom from worry, essential to produce the necessary placidity of the normal and natural mother, is so often non-existent today.

Accurate returns are being requested from the Sisters of the Infant Health Services to give some idea as to the amount of breast feeding carried out in their particular districts. From the figures submitted it will be seen that some districts are definitely in advance of others, and, in many cases, this is due to the enthusiasm and patience of the Sisters and the manner in which they encourage and educate the mothers to continue with breast feeding.

The returns for the year 1952 show that throughout the State 37·67 per cent. of mothers are now fully breast feeding their babies for the first five months of life, and 12·55 per cent. are partially breast feeding for the same period, making a total of 50·22 per cent. of babies who receive a certain proportion of breast milk during the first five months of life.

These figures show a slight decrease in the number of mothers breast feeding their babies and it is evident that the encouragement and energy of our Infant Health Sisters will be required more than ever during the coming years to maintain even these percentages.

Expansion.

There are now 44 full-time Centres and 256 Sub-Centres.

Centres :

Metropolitan, including Correspondence Scheme	....	....	....	22
Country	....	....	....	22
			—	44

Sub-Centres :

Metropolitan	49
Country	207
				—	256

TOTAL Centres and Sub-Centres for whole State	300
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When any of the Centres are closed through the prevalent shortage of nurses, which happens occasionally, mothers can obtain assistance from the Correspondence Infant Health Sister until their own Centre re-opens.

New Infant Health Buildings.

Work in connection with new Infant Health buildings progressed steadily throughout the State. New Centre buildings have been erected and opened at South Perth (Labouchere Road), Carilla, Mandurah and Meckering, while a building has been purchased and converted for a clinic and Sister's quarters at Wyalcatchem, and new living quarters have been provided for the Sister at Mingenew.

Also Beverley and Collie, both beautiful buildings with a furnished Sister's flat attached, were opened.

New Sub-Centres were opened during the year at Walpole, Wexcombe, Bodallin, Westonia, and many other districts are formulating their plans and making arrangements for the erection of Infant Health buildings during the ensuing 12 months.

Correspondence Section.

The Correspondence Sister, as well as carrying out the work already specified in her office, has paid regular visits to the North-West as far as Wyndham, including the rapidly growing settlement at Wittenoom Gorge. The Sister has also made regular visits to the Murchison district extending along the line as far as Meekatharra. Owing to transport difficulties and the time available in order to keep to a schedule, Wiluna was not visited this year, but arrangements have been made to include Wiluna in the next visit to the North-West. Most of the travel on these visits has to be done by air.

Three trips were made during the year, in May, August and October-November. The trips to the North-West usually take about two and a half weeks and to the Murchison one week.

During these visits Sister examines as many pre-school children as possible, as well as all babies in the area.

The Correspondence Sister, in addition to giving service to all mothers in the districts mentioned, keeps in contact with all mothers in isolated and scattered areas throughout the State. In addition, when a Centre shuts down the mothers in the district affected are contacted and invited to keep in touch with this Sister until a new Sister is supplied. By this means a complete coverage can be given in Infant Health work throughout the State.

Mothercraft Lectures.

These lectures are proving increasingly popular and have been continued and increased in number through the year, and have been organised in such a manner that the various Infant Health Sisters in the country give lectures to the students at High Schools in their own areas.

In the metropolitan area, the Sister appointed to deliver all mothercraft lectures has been kept increasingly busy and it is very gratifying to note the growing enthusiasm of the students attending these courses.

The Convent Schools have not yet received this service, but is hoped to commence classes for their pupils in the ensuing year.

Number of children lectured	....	1,036
Number of children taking examinations	....	943
Results—		
Honours	....	281
Credit	....	192
Passes	....	370
Failures	....	100

All classes instructed attended wither an Infant Health Centre or Mothercraft Corner to see them in working order. Lectures were also given to St. John Ambulance Junior Cadets and Girl Guides. Additional lectures were organised during the year for the Teachers' College, expectant mothers, Junior Farmers' Camp for Girls, and Kindergarten Trainee Teachers.

Radio Talks.

These were organised as in the previous year and put on a network throughout the whole State. They again proved exceedingly popular and our sincere thanks are due to 6AM and 6PM for this free service.

These talks in no way take the place of visits to the Centre, but give good and regular advice to those mothers who are not, for many various reasons, able to attend in person. They assist in maintaining constant and regular interest in "child health". In other words "it pays to advertise," because people do not become interested until they have a baby in the house, and then it becomes a personal and living interest to them. Therefore, it is essential to keep up these regular broadcasts.

Infant Mortality.

The infant mortality rate was 24·91 per thousand live births for the year 1952, which is still regrettably high in comparison with the Australian figure of 23·79. The greater number of deaths take place under one month of age—(71 per cent.), i.e., before they come under our Infant Health Centre care.

	Per thousand live births.
New South Wales	24·50
Victoria	22·29
Queensland	24·94
South Australia	23·09
Tasmania	21·73
Northern Territory	31·25
Australian Capital Territory	23·59

Pre-School Section.

The Infant Health Sisters are taking an increasing interest in this section and are still endeavouring to work up a Pre-School Section on certain specified days per month in order to encourage the mothers to bring their pre-school children for regular supervision. It is thus hoped to cover that period between leaving the care of the Infant Health Centre until receiving that of the School Medical Service at the age of five to six years, which in the past, and still is, a "no-man's land."

It has now been agreed that the School Medical Service, as from the 1st January, 1953, shall be responsible for the medical supervision of all children attending existing kindergarten schools and it is hoped that in the not too distant future an increasing proportion of this age group will thus come under routine medical examination.

Scales.

The position as last year is still very difficult with regard to baby scales, but we have been fortunate in being able to provide a number of scales which were imported from abroad. It is hoped that the supply of scales will remain adequate during the ensuing year.

Sisters.

The Infant Health Service has continued to be most fortunate in having an excellent group of Sisters who have worked very well and consistently for a great number of years, and the new Sisters coming on to the staff appear to show great interest in the work and the desire to stay with us as part of a permanent team.

Sisters in the Infant Health Service are always chosen carefully as it is obviously essential that they should have pleasant personalities so that mothers will wish to go and see them.

All Infant Health Centres remained open throughout the year. Relief Sisters have now been appointed to the staff for work during holidays and sickness, and while these are not employed permanently, such Sisters are a very great help to the organisation.

Holiday Leave.

As in the past, all Centres throughout the State will close down for three weeks after Christmas and New Year, re-opening on or about the third Monday in January. This scheme has the advantage, as in the past, of giving Sisters their holidays at a good time of the year and at a time when the majority of the mothers go away on their own holidays.

Fremantle, Perth and Correspondence Section will, as before, remain open so that any worried or anxious mother with a young baby or child will be able to receive help or advice by a visit or telephone call.

Lotteries Commission.

The Lotteries Commission has again made very considerable grants of money towards the cost of erection of new buildings and in other cases given money towards the furnishings of rooms provided. The Commission has also been most generous in the provision of new scales for various Centres, and its efforts on behalf of the Infant Health Service generally are very much appreciated by this Department.

Local Infant Health Committees.

Local Infant Health Committees are to be found in many towns or suburbs where there is an Infant Health building. These Committees are responsible in most cases for building, furnishing, cleaning and maintenance of the Centre, and for the purchase of a motor car where one is necessary. The Committees are purely honorary and do a great deal of very hard work on behalf of the Infant Health activities in their own towns and districts, and the grateful thanks of this Department are due, as ever, for their continued co-operation.

Local Authorities.

It continues to be the policy of this Department to encourage all Local Authorities to take an increased interest in Infant Health activities, and they are now becoming much more sympathetic and in a great number of instances are prepared to accept a definite responsibility towards this work. In many instances, they are assuming the role of the Infant Health Committee, while in other cases, they have assumed the full responsibility for the planning and erection of the building.

Government.

The Government has also been very generous to this section of preventive public health work and is recognising more and more the great value which it has for the public. It has, on all occasions, granted the requested money for necessary extra staff when required for further expansion of the work, and also accepts responsibility for the payment of the Sisters' salaries, mileage rates, general travelling allowance and the petty expenses of the Centres.

Conclusion.

During the year I was on extended Long Service and Study Leave, and every Sister in the service agreed to stay at her post during my absence, and not one defaulted. For this I was extremely grateful as it ensured the smooth continuity of the service. Some of the Sisters stayed at great personal inconvenience, to these particularly—and to all the Sisters—I extend my grateful thanks for their loyalty to the Infant Health Service, and for their interest and excellent work.

E. M. STANG,

M.B., B.S., D.P.H.

Medical Supervisor of Infant Health.

APPENDIX XIII.
INFANT HEALTH CENTRES—ATTENDANCES.

Statement of Work Done in Infant Health Centre from 1st January to 30th December, 1952	Al- bany.	Bever- ley.	Boul- der.	Bridge- town.	Bun- bury.	Bussel- ton.	Collie.	Corri- gin.	Gerald- ton.	Kal- goorlie.	Katan- ning.	Keller- berrin.	Manji- mup.	Moora.	Narro- gin.	Norse- man.	Nor- tham.	Three Springs.	Wagin.	War- oona.	Wyal- kat- chem.	Arma- dale.	Bicton.
Birth Notifications Received	388	187	250	232	185	357	...	277	341	424	279	268	270	232	303	66	25	190	327	277	195	332	296
No. of Individual Babies who attended	613	364	230	384	312	557	...	548	484	646	290	457	385	470	418	106	362	413	1,754	666	392	535	609
Total Attendance	4,764	3,972	524	3,259	3,315	5,903	...	4,511	3,041	6,235	2,681	4,451	3,356	3,316	3,022	1,312	2,388	3,649	3,425	4,988	2,969	5,442	4,505
No. of Individual Pregnant Women Advised	4	31	7	11	...	4	...	25	9	43	2	...	1	15	4	12	4	58	...	4	13	5	44
Total No. of Visits to Homes	362	131	276	147	62	...	...	223	136	145	257	486	237	...	84	268	798	115	345	278	261	834	504
References to Doctor or Hospital—																							
(a) Babies	113	39	38	8	9	56	...	329	78	179	5	7	42	26	47	...	20	76	32	33	30	33	44
(b) Mothers	21	...	4	...	3	8	...	230	15	54	3	...	1	3	3	20	2	20	2	1	8	4	9
No. of Letters and Telephone Calls re Advice	143	72	27	39	27	19	...	476	132	230	43	3	43	47	62	...	35	134	40	1	51	77	...
Feeding under 9 months—																							
Breast	87	45	48	78	50	95	...	50	83	103	71	58	61	57	85	58	56	50	279	77	49	89	90
Breast with Complementary	48	12	10	14	42	38	...	16	24	39	7	18	24	35	21	8	37	8	70	22	16	30	31
Artificially Fed—																							
Cows Milk	65	14	...	40	23	45	...	20	14	7	37	10	27	34	29	...	15	7	135	19	15	40	1
Cows Milk Dried	78	22	40	47	4	46	...	29	85	9	39	53	19	49	62	32	74	36	235	50	1	17	9
Cows Milk Condensed	1	3	...	1	2	7	...	6	1	6	...	4	1	...	2	...	4	1	9	1	2	7	2
Patent Foods	1	...	...	...	98	108	...	3	...	64	2	...	1	...	1	...	...	...	15	...	37	2	3
Educational Diet	...	52	9	...	100	...	...	66	...	...	56	94	...	58	107	...	...	...	280	...	57	...	87
Total	280	148	107	180	319	339	...	190	207	228	212	237	133	233	307	98	186	102	1,023	169	177	185	223
Percentage of those Babies who attained the age of 9 months in 1951, who were in the first 5 months—																							
(a) Fully Breast Fed	27·91	33·56	33·33	38·98	13·21	36·72	...	42·5	6·61	31·82	45·49	43·14	36·94	35·08	34·23	42·11	31·53	38·04	33·52	35·04	34·12	31·91	51·21
(b) Partially Breast Fed	13·47	11·49	16·97	3·97	11·32	11·8	...	12·5	9·3	15·91	13·30	1·47	13·65	21·05	9·64	5·26	18·02	10·43	13·35	8·84	2·41	34·19	20·6

APPENDIX XIII—continued.
INFANT HEALTH CENTRES—ATTENDANCES—continued.

Statement of Work Done in Infant Health Centre from 1st January to 30th December, 1952.	Claremont.	Cottesloe.	East Fremantle.	East Vic. Park.	Fremantle.	Hollywood.	Inglewood.	Kalamunda.	Kennington.	Maylands.	Mid. Jctn.	Mt. Hawthorn.	Mundaring.	Nedlands.	Osborne Park.	North Perth.	Perth.	South Perth.	Subiaco.	Vic. Park.	Wembley.	Total.	Total for 1951.
Birth Notifications Received	236	303	225	344	649	120	311	325	303	511	389	322	211	105	467	599	480	261	262	573	339	13,036	12,790
No. of Individual Babies who attended	478	558	714	591	1,010	450	778	689	737	656	587	673	442	225	607	701	668	594	698	602	429	23,952	21,879
Total Attendance	5,258	5,989	2,953	5,221	8,645	3,707	5,956	6,634	6,267	6,867	3,766	5,452	5,014	2,615	6,857	6,081	6,047	5,639	4,838	5,920	5,353	197,207	186,679
No. of Individual Pregnant Women Advised	53	....	2	7	42	10	13	2	18	36	....	62	48	17	6	43	64	30	38	62	1	850	813
Total No. of Visits to Homes	1,472	582	543	348	584	683	483	273	580	631	199	591	1,511	157	709	846	810	232	787	298	376	18,644	19,795
References to Doctor or Hospital—																							
(a) Babies	65	14	160	68	228	45	62	13	73	69	41	29	48	27	64	56	66	67	79	111	25	2,654	2,566
(b) Mothers	34	....	27	21	35	7	2	2	12	7	2	20	9	2	11	1	21	3	20	33	1	681	753
No. of Letters and Telephone Calls re Advice	181	162	36	86	239	....	352	32	131	11	14	2	39	146	1	341	718	386	31	353	104	5,066	4,146
Feeding under 9 months—																							
Breast	136	90	107	158	220	114	157	92	391	108	52	184	81	61	127	145	257	100	107	168	93	4,667	4,534
Breast with Complementary	18	32	26	22	54	11	34	33	112	19	34	25	22	8	30	26	31	15	15	14	11	1,162	920
Artificially Fed—																							
Cows Milk	20	40	25	80	46	22	101	18	157	88	26	45	20	15	31	105	86	60	14	52	38	1,686	1,513
Cows Milk Dried	61	28	70	107	9	48	72	67	180	48	63	53	55	14	54	77	120	28	21	100	18	2,329	2,494
Cows Milk Condensed	5	3	....	25	5	5	6	12	6	7	3	6	4	3	1	13	22	5	3	10	5	209	155
Patent Food	....	3	2	4	....	....	....	....	16	9	6	1	1	....	3	....	4	....	5	....	....	398	143
Educational Diet	....	....	182	....	....	....	....	....	348	122	....	159	....	....	....	....	97	80	....	....	....	1,954	1,790
Total	240	196	412	396	334	200	370	222	1,210	401	184	473	183	101	246	366	617	288	165	344	165	12,405	11,549
Percentage of those Babies who attained the age of 9 months in 1951, who were in the first 5 months—																							
(a) Fully Breast Fed	56.8	47.33	45.93	34.39	31.68	41.82	31.88	35.69	47.7	36.27	28.9	52.52	36.12	53.02	54.2	41.57	30.33	42.14	55.02	58.82	46.48	37.67	40.14
(b) Partially Breast Fed	7.1	9.87	10.8	9.55	59.4	10.91	8.12	14.13	10.25	6.86	6.42	10.92	10.16	40.27	9.51	12.79	3.52	12.04	5.61	15.69	3.28	12.55	12.25

APPENDIX XIV.

SCHOOL MEDICAL SERVICE.

The Commissioner of Public Health.

I have the honour to submit a report on the School Medical Service in Western Australia for the year 1952.

The total staff available for this Service is, as last year, one administrative officer and five full-time field Doctors and eight full-time Nurses. It has been possible with this staff to carry out a systematic medical examination of all children attending High Schools, State Schools and Convent Schools throughout the country and metropolitan areas of the State every two years. The proposal to extend this service to cover those schools where fees are paid has been generally approved and will be implemented at the first available opportunity.

Children in Kindergartens are at present only examined by Departmental Medical Officers on request, because many kindergartens have their own honorary Medical Officers who have been doing the examination over the past years, and they may continue to do so if desired. It is the aim and intention of this Department to see that all kindergartens have the benefits of a regular routine systematic medical examination whether by Departmental or other Medical Officers.

For the year 1952, 40,407 school children were examined, of which 18,736 were in the country districts and 21,671 were in the metropolitan area. The number of children of school age throughout Western Australia in Convents, Primary and High Schools was 92,079.

A special effort was made this year by most of the School Doctors to interview the mothers of the young children, i.e., new entrants into the School—2,248 such parental interviews took place. This service will be persevered with and extended as it is most valuable both to the parents and Doctors.

The number examined reflects very creditably on the School Medical staff, all of whom worked wholeheartedly throughout the year.

Of the total number of children examined, 16,870 were notified as having some defect, the majority of these defects being of a slight nature and requiring home attention or observation. By observation is meant that the parents were told to watch a certain condition and if it got worse then to obtain medical advice.

Out of the total figure examined, only 4,291 were referred for medical attention. This is a very satisfactory state of affairs and suggests that the operation of the School Medical Service throughout the previous years is now beginning to show some definite results.

Eight thousand, one hundred and seventy-nine children were referred for dental attention. This high proportion means that more than 22 per cent. of children in this State were suffering from dental defects.

It is interesting to note that a comparatively small number of children are now being referred for nose and throat defects, 449 being in the country districts and only 218 in the metropolitan area. One thousand, six hundred and fifty-two children were referred for eye defects, 852 being in the metropolitan area and 800 in the country districts.

The remainder of the children who were referred for medical attention were suffering from a variety of ailments, such as heart defects, rheumatism, skin complaints, etc.

During this year for the first time, advantage was taken by the School Medical Officers of the excellent service provided by the Commonwealth Acoustic Laboratory, 179 children with defective hearing being referred for detailed testing with the delicate scientific acoustic instruments now available. The type and degree of deafness was ascertained and advice given to the parents concerning prognosis and future medical procedure when required.

Nutrition.

Of the total number of children examined, it was found that 33,901 were of normal nutrition, 4,373 were above the normal standard and 2,133, that is five per cent, were below standard nutrition. This figure is again an improvement on the figure for 1951, but it is surprising that understandard children still exist in this country of good food and high wages. This does not, of course, mean that the children were grossly below standard, nor, in most cases, do I think it means that they are not getting enough to eat, but it means possibly that they are not getting the right type of food which they require.

There is undoubtedly still room for the education of parents regarding the proper food to give the children and, in this connection, it is disappointing to note that the Oslo lunch project has not continued to gain ground, for nine schools only are now incorporating the Oslo lunch as part of their normal school activities. Where there is an enthusiastic head teacher and an energetic Oslo Lunch Committee children can be provided with a very satisfactory lunch for 9d. to 1s. per day, which is a better lunch than most mothers are able to provide for the same figure.

In addition, children, during the winter months, are given a large bowl of hot vegetable soup which is usually included in the above price, and it is to be hoped that in the following years some stimulus can be given to encourage a much larger number of schools to maintain this service. It may be necessary to subsidise Committees, so that lunches can be provided at an even cheaper rate, particularly for necessitous cases, when recommended by the Medical Officer.

North-West.

In the majority of the schools in the North-West the children were, as previously, examined by the local Doctors and it is anticipated that this work will be continued.

School Nurses.

There were new additions to the School Nursing staff during the year, but they are all now fully trained and available for work with the School Doctors, home visiting, hygiene examinations in the schools, and conferences with school teachers and some office duties.

Home Visiting.

The home visiting, or follow-up section, is considered of vital importance in the School Medical Service, because as a result of these home visits, a great deal of previously recommended medical attention is obtained. Many of the parents do not understand what real defect is present in their children, but when the problem is explained kindly, intelligently and sympathetically by the School Nurse, willing and active co-operation can then be obtained.

Three thousand, one hundred and seventy-two home visits were paid during the year, of which 3,010 were in connection with children who required medical attention. Of this number, it is pleasing to note that 1,461 of the children had already had the medical attention and a further 639 promised to obtain it. Forty-two were unfortunately quite disinterested, but these will be persevered with. Also other parents who promise medical attention will be followed up by visits to see that it has been obtained.

Of the visits paid, 548 parents were either out or had left the district and there seems, as last year, to be a large number of "floating" families, particularly amongst the migrant section of the population.

Child Hygiene.

Very close supervision is kept by the School Nurses on the cleanliness of the schools, particularly with regard to pediculosis or head infections. Through consistent action in this matter, the percentage of dirty heads in the State Schools has been reduced to .4 per cent. and in the Convents to .9 per cent.

This great improvement has only come about through the persistent efforts of the nurses, together with full co-operation from the teachers in the schools. It would be pleasing to be able to report that the pediculosis percentage for the State was nil, but it is doubtful whether this will ever be achieved.

Correspondence Classes.

Close co-operation between the School Medical Service and the Correspondence Classes is now existing. As last year, the Education Department is notified by us concerning the different country districts that the School Medical Officers propose to visit and approximately the time that they are expected to be there. The Correspondence Section in turn notifies those of its pupils who are living near to any one school and requests them to ascertain when the medical examination is to take place and to present themselves at that time.

Conclusion.

The Parent and Citizen Associations are still asking for an annual medical examination of school children, which goes to show how far the public has been made aware of the advantages of this little advertised, but extremely essential service.

This education of the public to look for, and achieve, treatment for defects, which occur in the early years of a child's life, has been largely due to the efforts of the School Medical Service over the past years.

It is, however, open to serious question whether, with the coming of a "free" medical service or National Health Scheme, it is now necessary to have as extensive a school medical service in the future, as we have had in the past. The School Medical Service was extremely necessary when it started, both to improve the health of the child, and to educate the parents and public to a "health conscience." These two purposes have now been fulfilled.

A School Medical Service will always be necessary, but its form or policy will change, and there will be more emphasis on the positive side, with, if necessary, the establishment of School Medical Treatment Clinics for special purposes, e.g., Eyes, etc.

Also it is certain that a complete medical examination of all children entering school for the first time will continue, as being essential to the well-being of the child community. Children with any defect will be kept under constant observation until in perfect health.

A greatly increased School Nursing Service will be needed, and very close co-operation between this Service and the Teachers will be established so that during the conferences between the two any noticeable ailment or defect in the children under their care can be discussed and action taken. This method will be greatly to the benefit of child health, and at the same time conserve medical manpower.

It should always be borne in mind that the essential function of School Medical Service is preventive, and aims at achieving and maintaining health, and with correcting those physical and functional faults which lower the health potential in the child and lead to established ill-health in the adult. Our object must always be to see to it that our children have all or any defects corrected so that they are in as perfect a state of health as possible, and then by constant supervision see to it that they are kept at their maximum of physical efficiency, in other words "Keep the well child well."

The necessity for maximum co-operation on behalf of the parent is obvious, and it is the policy of this Department to follow-up all notifications of defects by visits to the parents to ensure, as far as possible, that medical advice on behalf of the child, has been taken within a reasonable time. At present, School Nurses visit all schools in the metropolitan and sub-metropolitan areas once or twice a year, and it is hoped that this will be continued and even extended to a more frequent service, if possible.

Even closer co-operation between the Education Department and the Public Health Department is necessary and, as stated above, especially between Teachers, Nurses and Doctors. At the present time, School Medical Officers are conducting their examinations under extremely trying conditions due to the overcrowded state of the schools and it is hoped that as soon as possible properly equipped medical rooms, adequate lighting, heating and ablutionary facilities, will become available. At the present time, even where medical rooms have been built, they are unavailable to us as they are being used as classrooms.

We have, I think, every reason to be proud of the School Medical Service, which covers the vast area of this State, and which compares favourably with that of any other country in the world, but we must not cease to endeavour to expand the scope and value of this Service even more, as the population of our State increases and to provide, as far as possible, even more positive benefits to the school population, which is, and always will remain, the backbone of our future State.

In conclusion I would like to thank the School Doctors who have worked well and faithfully under most difficult conditions ; the School Nurses, who have done likewise, and lastly and especially, Dr. Ward, who carried on my duties most efficiently and smoothly during my Long Service leave.

E. M. STANG,
M.B., B.S., D.P.H.
Senior Medical Officer of Schools.

APPENDIX XV.

SCHOOL MEDICAL SERVICE.

Examination of Metropolitan and Country School Children, 1952.

—			No. Ex- amined.	No. Notified.	No. referred for Medical Attention.	No. referred for Home Atten- tion and Obser- vation.	No. requir- ing Dental Atten- tion.	Skin Complaints.		Nutrition.			Eyes Medical Atten- tion.	Tonsils Medical Atten- tion.
								No.	%	3.	Under 3.	Over 3.		
Metropolitan Schools.														
Boys ....	....	....	11,463	4,973	1,128	2,580	2,423	....	....	9,891	613	959	....	....
Girls ....	....	....	10,208	4,864	1,189	2,492	2,491	....	....	8,477	555	1,176	....	....
Total ....	....	....	21,671	9,837	2,317	5,072	4,914	1,825	8.4	18,368	1,168	2,135	852	218
Country Schools.														
Boys ....	....	....	9,404	3,376	932	1,559	1,574	....	....	7,965	572	867	....	....
Girls ....	....	....	9,332	3,657	1,042	1,836	1,691	....	....	7,568	393	1,371	....	....
Total ....	....	....	18,736	7,033	1,974	3,395	3,265	1,084	5.7	15,533	965	2,238	800	449
State Total.														
Boys ....	....	....	20,867	8,349	2,060	4,139	3,997	....	....	17,856	1,185	1,826	....	....
Girls ....	....	....	19,540	8,521	2,231	4,328	4,182	....	....	16,045	948	2,547	....	....
Total ....	....	....	40,407	16,870	4,291	8,467	8,179	2,909	7.1	33,901	2,133	4,373	1,652	667

APPENDIX XVI.

SCHOOL DENTAL SERVICE.

The Commissioner of Public Health.

Following is my report on the activities of the School Dental Service for the year 1952.

STAFF.

Although in 1951 the establishment was raised to 14 we have not yet been successful in attaining a full complement of dentists and although in recent years the working conditions have been improved considerably it seems that something more will have to be done to induce men to join and stay in the Service. I consider that chairside nursing assistance would make our dentists much happier and would greatly increase their output.

During the year there were four resignations and four new appointments so the total remained at 12 ; there are two vacancies still to fill.

EQUIPMENT.

Delivery was taken of three more trailers so that we now have 12 of these mobile surgeries ; these, together with our utilities, are being well looked after by the Plant Engineer's Department at East Perth.

PREVENTIVE DENTISTRY.

Each of our dentists now carries one or two films which are shown both to children during school hours and to adults at Parents and Citizens' meetings. The films are very popular and are a great help in showing people the value of care of the teeth.

Facts in regard to the activities of the School Dental Staff during the year are as follows :—

Number of country schools visited	....	....	....	....	....	153
Number of metropolitan schools visited	....	....	....	....	....	18
Number of country orphanages visited	....	....	....	....	....	13
Number of town orphanages visited	....	....	....	....	....	18

It will be noticed that the emphasis is on the country ; quite a number of correspondence children were brought to various centres for treatment.

It should be stated also that the orphanages were generally visited during school vacations.

Number of children examined	....	....	....	....	....	....	9,725
Number of children treated	....	....	....	....	....	....	6,505
Number of children who needed no attention			....	....	....	....	2,088
Number who were to receive private attention			....	....	....	....	483
Number whose parents desired no treatment to be done	....	....			....	....	649

OPERATIONS PERFORMED.

[illegible]

Prostheses—a few dentures were constructed for children who had prematurely lost anterior teeth and a few orthodontic appliances made for the purpose of straightening teeth.

The usual weekly visit was made by myself to the Government Institutions listed below ; however, owing to the growth of administrative work connected with the School Dental Service I cannot now spend as much time at these places as in the past three or four years. Even when I first commenced attending the Institutions I was not able to do all the work which the Superintendents would have liked done and they are now of course very concerned about the future dental welfare of their people. The only solution I can see is for the appointment of a man to do full time work at the Institutions and preferably he should be under the control of the Dental Hospital.

Mental Hospitals.

[illegible]

Wooroloo Sanatorium.

Appointments	....	....	....	....	....	....	....	....	....	327
Extractions	....	....	....	....	....	....	....	....	....	150
Fillings and other conservative work	....	....	....	....	....	....	....	....	....	18
Prophylaxis	....	....	....	....	....	....	....	....	....	12
New dentures constructed	....	....	....	....	....	....	....	....	....	13
Repairs to dentures	....	....	....	....	....	....	....	....	....	11
Other treatments	....	....	....	....	....	....	....	....	....	6

Prisons.

Appointments	....	....	....	....	....	....	....	....	....	185
Extractions	....	....	....	....	....	....	....	....	....	101
Fillings	....	....	....	....	....	....	....	....	....	10
Prophylaxis	....	....	....	....	....	....	....	....	....	7
New dentures	....	....	....	....	....	....	....	....	....	6
Repairs to dentures	....	....	....	....	....	....	....	....	....	10
Other treatments	....	....	....	....	....	....	....	....	....	20

A. G. McKENNA,
Senior Dental Officer.

APPENDIX XVII.

LEPROSY IN THE NORTH.

Report by W. S. Davidson, Deputy Commissioner of Public Health.

Our native population in the North does not attain to that degree of enlightenment on the causation of disease or to a mode of sanitary living wherein the possibility of domiciliary or out-patient treatment of leprosy could be contemplated. Moreover, the wide dispersion of the population over a vast intractable country precludes the possibility of any form of treatment other than that given in the isolation of a special institution.

Whatever arguments may therefore be applied for the non-isolation of leprosy in civilised communities, they do not apply to leprosy among natives in the North if we are to hope for the eradication of that disease.

To stop the spread of the disease, reduce it and ultimately eliminate it, the following are therefore essential :—

1. Early detection of the infectious case.
2. Isolation of the infectious case and of the suspect case.
3. An effective cure within a reasonable period of time.

Hitherto the complete lack of No. 3 has largely sabotaged the efficiency of 1 and 2. Without a cure within reasonable time isolation meant incarceration for many years if not for life. Under the old treatments apparent cures were obtained but only too frequently after discharge from isolation the patient relapsed and despondently had to return. While infectious and before redetection he was of course a means of spreading the disease.

Leprosy being a comparatively new disease to the aboriginal and cases being sparsely spread over a wide area, he had little knowledge of the ultimate destructiveness of this insidious malady and consequently was extremely loath to risk incarceration for many years with little prospect of cure. It was therefore well-nigh impossible to obtain any degree of perfection in the early recognition and isolation of active cases. Where natives were living on Stations or in Missions and dependent for their livelihood on these institutions detection and isolation were possibilities but there remained almost untouched the constant focus of infection among the bush natives. These natives, aware that the consequence of detection was removal far from their tribal home for an indefinite period of many years, avoided such detection by judicious use of their expert knowledge of that boundless country. In preferring the disease to the treatment they can be little blamed as the matter must appear to them purely personal and of no communal importance, the long incubation period obscuring the mode of spread and rendering its contagiousness a matter beyond their comprehension.

In the post war years the sulphones and later Thiacetazone have altered the whole picture of leprosy treatment and in this State we have kept right up to date in the trial and use of these new chemotherapeutic agents. The results have been highly satisfactory to the patients and most encouraging to those who look after them.

To press home the advantage gained from drugs that present a possibility of cure within reasonable time the following regime has been instituted.

A patient is now discharged after he has shown negative smears for a minimum of one year. Previous minimum was two years.

He is however discharged to surveillance and is seen at least every six months after discharge. These surveillance examinations are the responsibility of the Medical Officer in whose district he lives but surveillance reports are sent to and centrally recorded by the Medical Officer in charge of the Leprosarium who is responsible for follow up of all cases.

An extra Medical Officer has been appointed to Derby. He is in charge of the Leprosarium, leprosy surveys and surveillance follow up. It is hoped that by keeping the same officer in this appointment for several years the standard of treatment and supervision of leprosy throughout the North will be improved and the continuity of these will suffer least if changes in the appointment of the Medical Officer are few.

Isolation of the suspect has always been a problem. To admit him to a native hospital where the staff is unskilled in handling leprosy is to risk its spread to other patients and to staff should he prove infectious. To admit the suspect to the Leprosarium was to expose him to a very definite risk of acquiring a disease he might not have. This problem has now been settled by the taking over of the nursing and care of patients in the Derby Native Hospital by the same order of nuns in charge of the Leprosarium. Suspect cases are now carefully watched and cared for in the Native Hospital by Sisters fully conversant with leprosy, its signs, symptoms and methods of control and treatment.

The net results of all these measures was not fully felt until 1952. In that year for the first time recorded discharges showed a credit balance of discharges over admissions to the Leprosarium. The figures for Leprosarium inmates now show a slow steady decrease instead of the constant slow increase that had been a distressing feature since the start of the institution.

The large number of discharges from the Leprosarium, many cases after a comparatively short stay for treatment, has been quickly appreciated by the native population throughout the North and a complete reversal of outlook is taking place. Instead of avoiding detection, isolation and treatment they now readily present themselves and if and when admitted their demand for the new treatments is such that it often is with some difficulty that they are persuaded to observe the rest periods from the drugs that the course requires.

With this new co-operation on the part of the native, the improvement in our drugs and technique and the continued care and enthusiasm of our Leprosarium and medical staffs we should look forward to an ever decreasing incidence of this disease and its ultimate elimination.

Experiments and investigations in treatments and technique are constantly being undertaken and carried out at the Leprosarium. Evaluations of the efficacy of various sulphone treatments thiacetazone and isoniazid have been made and have been or will be published in an appropriate medical journal.

The sum total of all this, should indicate that the Derby Leprosarium is not now a place of isolation or incarceration for lepers but an efficient institution curing leprosy and carrying out active research into the improvement of leprosy treatment for all of which adequate recognition must go to Dr. Grigoroff the Medical Officer and to Mother Alphonsus and her overworked staff.

ADMISSIONS AND DISCHARGES AT LEPROSARIUM, DERBY.

Year.				Admissions.	Discharges.	Total Re- maining.
1946	....	....	....	41	31	231
1947	....	....	....	41	29	238
1948	....	....	....	49	21	247
1949	....	....	....	47	15	268
1950	....	....	....	58	8	305
1951	....	....	....	54	6	333
1952	....	....	....	35	56	303

APPENDIX XVIII. HOSPITALS.

Commissioner of Public Health.

I have pleasure in submitting the following report for 1952, my appointment of Principal Matron to the Medical and Health Departments dating from March this year.

Up to the end of 1952 I have been able to visit most of the Departmental and Non-Departmental Hospitals in the State, including an inspection of all North-West Hospitals.

The standard of nursing in the country hospitals is affected by the shortage of trained nurses. Many who accept appointments hold them for a very short period and it is due to the loyalty and unselfish service given by the Matrons and Senior Nursing Staff in Hospitals that the quality of nursing care is kept on an acceptable basis.

Many hospitals are being improved and it is recognised that by providing proper accommodation, so the chances of obtaining and retaining nursing staff will be increased.

During the year a number of events have taken place which are worthy of record.

A successful Refresher Week for Country Matrons was organised by the A.T.N.A. in conjunction with the Medical Department. That an annual or biennial Refresher Week is necessary was evidenced by the enthusiasm displayed by those attending. This opportunity was given to a greater number of Matrons this year : 33 in all were given leave of absence to attend the Refresher Week.

During 1952, Government Scholarships for post graduate education at the College of Nursing, Melbourne, were awarded as follows :

Miss M. McEneroe, Matron, Katanning District Hospital, for a Nursing Administration Course.

Miss J. Hopkins, Royal Perth Hospital

Miss P. Martin, Princess Margaret Hospital } for Courses in Ward Administration.

Mr. G. Stuber, Royal Perth Hospital

Miss N. Simpson was appointed Matron at Kalgoorlie District Hospital.

The following are Private Hospitals now under Government control :—

Hawthorn Hospital, Mount Hawthorn (Maternity and General), as from May, 1952.

Stirling Hospital, Bunbury (Maternity only), as from March, 1952.

A large home in Claremont has been purchased and is to be opened as a "C" Class Hospital early in 1953, and to be known as "Knutsford."

Approval has been given to the Native Mission, Mogumber, to conduct a Maternity Wing.

A license was granted to Miss M. Watts, Oakley Street, Bunbury, to conduct a "C" Class Hospital ; this hospital to be known as the "Grosvenor."

The Denmark Hospital was temporarily closed on the 4th March, 1952, pending alterations.

The Murray District Hospital, Pinjarra, and Lake Grace District Hospital were opened in November, 1952.

Additions and renovations are in progress at the Woodside Hospital, Fremantle. This will be a Maternity Hospital.

The demand for institutional care for the aged and chronic sick continues to present a grave problem.

The attention of the Nursing Branch of this Department is from time to time directed to the unsuitable conditions prevailing in registered boarding houses, where in many instances bedridden people requiring nursing care are admitted and it is in rare cases only that these boarding houses are administered by trained nurses. Nor are trained nurses employed excepting in isolated cases. It is unfortunate that under present legislation the Public Health Department has no control regarding the administration of such boarding houses, and it is only when a complaint is lodged that an opportunity to inspect presents itself.

The following comments are summarised from a report submitted by Miss Harler, the Organiser of Nursing Training on the training of Student Nurses in Country Hospitals from January to December, 1952.

Applications for training in Country Hospitals come from an equal number of metropolitan and country candidates, the desire for country training being actuated by the wish to remain in the country or because the prospective student prefers to be one of a smaller community than would be the case in a large metropolitan Training School.

General Nursing Training in Country Hospitals can be carried out successfully providing the theoretical instruction can be correlated to practical work and that efficient supervision can be exercised by Tutors, whether certificated or experienced Sisters.

The task of Matrons and teachers is made easier by knowing that the student in training is suitably accommodated and it is for this reason that overcrowding in staff quarters is to be deplored. This comment applies to the Northam Hospital.

Appointments :

Kalgoorlie District Hospital.—Mrs. Beard has been appointed temporary part-time Clinical Supervisor. Miss D. Sheean will take this permanent appointment when she is released from her present post as Acting Assistant Matron.

Northam District Hospital.—Miss J. F. Terry's appointment as Clinical Supervisor dates from July 7th, 1952. Miss Terry obtained one month's experience at the Central Training School before proceeding to the Hospital.

Geraldton District Hospital.—The post of Clinical Supervisor was filled by Miss E. McClean.

Central Training School.

Panel of Lecturers.—It is desired to record the interest and co-operation of all lecturers who give theoretical instruction to the students.

Recruitment.—Four Preliminary Schools of ten weeks' duration were held during the year

The total number of students enrolled = 60.

Appointments terminated during Preliminary Training = 6.

Resignations and Termination of Appointments of Nurses who had completed one year or more of Training.

Resignations = 25.

Termination of Appointment = 8.

Total number of students in training on December 31, 1952 = 143.

Total wastage for year ending December, 1952 = 23.1 per cent.

Examination Results.

Nurses Registration Board Final Examination :—

41 students sat for examination.

36 students passed and of these 6 obtained credits.

2 Re-sits from Kalgoorlie.

2 Re-sits from Collie and Kalgoorlie.

1 Re-sit from Merredin and Kalgoorlie.

Nurses Registration Board First Professional Examination :—

55 students sat for examinations—of these

43 passed

12 Re-sits—of these two resigned and one failed twice, necessitating resignation.

In comparison with the previous year resignations have declined and this, no doubt, is due to a higher degree of selectivity. For this reason the intake of students is less. Because efforts are being made to recruit a better type of student, wastage is being reduced and a higher standard of nursing attained. It is anticipated that in the future the number of suitable candidates offering for General Training will increase.

Situation of the School.—The school is functioning satisfactorily, but a greater degree of tone would be experienced by both students and tutors if the school could operate as a complete unit.

Accommodation.—The class room accommodation is crowded as also are the living quarters.

Equipment at the School.—The equipment is adequate for the practice of modern teaching methods.

Visits of Country Hospitals.

Visits to the hospitals over the nine months have numbered 17. The time spent at each hospital is from two to four days, depending on the bed average.

Hospitals visited are :—

Kalgoorlie.

Geraldton.

Northam.

Collie.

Narrogin.

Merredin.

The staff of the Central Training School desires to record appreciation for the help and consideration extended to them by the staff of the Medical Department.

I would like to place on record my appreciation of the help afforded me by Miss Railton, Assistant Matron.

P. F. LEE,
Principal Matron.

APPENDIX XIX.
NURSES' REGISTRATION BOARD.

Ten meetings were held during the year.

On 18th December, an amendment of the Nurses' Registration Act was assented to by Parliament giving the Board power to train and enrol a class of nurse to be known as a Nursing Aide, the course of training to extend over 12 months.

The number of nurses registered in the various divisions of the register whose registrations were in force at the end of the year was :—

	1952.	1951.
General	2,040	(1,879)
Children's	28	(25)
Infant Health	174	(175)
Mental	41	(40)
Midwifery	1,010	(985)
Tuberculosis	44	(34)
Mothercraft	14	(15)

Figures in parenthesis are those of 1951 for comparison.

Four applications were received, and approved, for restoration of names to the midwifery division of the register.

Eighteen examinations were conducted during the year, as follow :—

General and Children's....	....	....	3
Mental ....	....	....	1
Midwifery ....	....	....	3
Tuberculosis ....	....	....	3
Mothercraft ....	....	....	2
First Year Professional	....	....	3
Educational ....	....	....	3

APPENDIX XX.
WESTERN AUSTRALIA.

DERBY LEPROSARIUM.

Admissions and Discharges for the Year 1952, compiled from Monthly Returns
of the Superintendent.

Admissions.										Discharges.						Inmates Remaining in Leprosarium.					
Male.					Female.					Male.						Female.					
Male.					Female.					Male.						Female.					
Male.					Female.					Male.						Female.					
Male.					Female.					Male.						Female.					
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Male																					

Analysis of Admissions and Discharges during 1952.

Inmates as at 31st December, 1951	333
Admissions for period ended 31st December, 1952	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	35
Discharges for period ended 31st December, 1952	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	56
Deaths for period ended 31st December, 1952 ....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Absconded for period 31st December, 1952 ....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
Total Remaining at Leprosarium 31st December, 1952	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	303

APPENDIX XXI.
VITAL STATISTICS.
WESTERN AUSTRALIA.

										1950.	1951.	1952.
Mean Population—												
Males										287,152	299,024	310,441
Females										271,557	282,435	291,585
Total										558,709	581,459	602,026
Births—												
Males										7,293	7,684	7,826
Females										6,935	7,110	7,587
Total										14,228	14,794	15,413
Birth Rate per 1,000 of mean population										25·47	25·44	25·60
Deaths—												
Males										3,022	3,086	3,077
Females										2,036	2,202	2,132
Total										5,058	5,288	5,209
Death Rate—Rate per 1,000 of mean population										9·05	9·09	8·65
Natural Increase—Rate per 1,000 of mean population										16·42	16·35	16·95
Infant Mortality per 1,000* births—												
Metropolitan Area										25·41	26·38	23·52
Rest of State										28·83	30·84	27·69
Whole State										27·13	28·73	24·91
Stillbirths—												
Metropolitan Area										121	144	125
Whole State										240	297	283

* Excluding Stillbirths.

COMPARISON OF INFANT MORTALITY AND GENERAL DEATH RATE.

Place.							Infant Mortality.			General Death Rate.		
							1950.	1951.	1952.	1950.	1951.	1952.
New Zealand (a)	....	....	....	....	....	....	22·75	22·77	21·62	9·31	9·56	9·28
Western Australia	....	....	....	....	....	....	27·13	28·73	24·91	9·05	9·09	8·65
New South Wales	....	....	....	....	....	....	27·04	26·29	24·50	9·60	9·62	9·45
Victoria	....	....	....	....	....	....	20·09	22·61	22·29	10·14	10·33	9·99
Queensland	....	....	....	....	....	....	24·77	25·66	24·94	8·82	9·20	9·05
Tasmania	....	....	....	....	....	....	23·75	26·64	21·73	8·74	8·76	8·48
South Australia	....	....	....	....	....	....	24·04	24·51	23·09	9·63	9·98	9·53

(a) Non Maori.

APPENDIX XXII.

NOTIFICATION OF EACH TYPE OF INFECTIOUS DISEASE RECEIVED
BY THE DEPARTMENT OF PUBLIC HEALTH FOR EACH WEEK OF
THE YEAR ENDED 31st DECEMBER, 1952.

Week of Year.	Acute Rheumatism.	Amoebiasis.	Ankylostomiasis.	Brucellosis.	Chorea.	Diphtheria.	Dysentery (Amoebic).	Dysentery (Bacillary).	Infantile Diarrhoea.	Infective Hepatitis	Lead Poisoning.	Leprosy.	Malaria.	Meningococcal Infection.	Paratyphoid.	Poliomyelitis.	Pleural Effusion.	Puerperal Fever.	Purulent Ophthalmia.	Rubella.	Salmonella Infection.	Scarlet Fever.	Trachoma.	Tetanus.	P.T.B.	Other T.B.	Typhoid Fever.	Typhus Fever.		
1	...	1	2	...	...	3	...	...	...	2	...	...	...	1	...	3	1	...	1	3	...	...	...	...	...	7	...	...	...
2	1	...	2	...	...	...	9	...	...	...	2	...	...	...	...	...	3	...	...	...	...	13	...	...	...	...
3	2	...	...	...	2	...	...	...	...	...	...	2	...	...	2	...	...	...	...	11	...	...	...	...
4	3	...	...	...	8	...	...	...	1	...	1	2	...	...	2	...	...	...	...	11	1	...	...	...
5	3	...	...	1	7	...	...	...	...	...	1	...	...	...	1	...	2	...	...	7	...	...	...	1	
6	3	...	1	...	13	...	1	...	5	...	...	1	...	...	...	...	...	...	...	15	1	...	...	1	
7	1	...	...	...	9	...	...	...	...	...	1	...	...	...	1	...	1	...	...	7	...	...	...	1	
8	1	...	1	...	7	...	3	...	3	...	2	...	...	...	...	...	...	...	...	6	...	...	...	1	
9	5	...	...	...	13	...	...	...	2	...	1	...	...	2	2	...	...	...	...	8	...	...	...	...
10	1	...	...	...	12	...	...	...	1	1	1	...	...	...	1	...	4	...	...	7	2	...	...	...
11	2	...	2	...	20	...	...	...	...	...	3	...	...	...	...	...	...	...	...	7	...	...	...	...
12	3	...	6	3	21	...	3	...	...	...	2	...	...	...	6	1	2	...	...	11	1	...	...	...
13	2	...	...	...	23	...	...	...	...	...	...	...	...	...	1	...	...	...	...	5	1	...	...	1	
14	1	...	2	...	11	...	...	1	1	...	3	...	...	...	3	...	4	...	...	9	1	...	...	1	
15	1	...	...	...	...	2	...	1	...	13	...	3	...	...	...	2	...	...	...	3	...	1	...	...	14	1	...	...	1
16	4	...	...	...	4	...	...	...	1	...	1	...	...	...	...	...	...	...	...	7	1	...	...	...
17	2	...	2	...	9	...	...	...	...	...	2	...	...	...	...	...	4	...	...	7	1	...	...	1	
18	2	...	...	1	...	10	...	12	...	1	1	1	...	...	1	...	...	3	3	...	...	2	7	1	...	...	1	
19	2	...	...	...	2	...	14	...	...	...	...	...	...	...	...	1	...	3	1	...	...	10	1	1	...	1	
20	2	1	4	...	...	...	1	...	1	...	1	2	2	1	5	...	...	15	...	...	...	...
21	2	1	...	...	...	...	...	2	1	16	...	...	...	...	...	...	...	1	...	3	...	2	...	...	7	...	1	1	...
22	1	...	...	...	...	3	...	13	...	...	...	...	...	1	2	...	...	1	1	...	...	...	9	1	...	...	1	
23	...	1	1	...	...	5	...	...	...	6	...	...	...	...	...	1	...	...	...	...	...	3	...	...	9	1	...	...	...
24	8	...	1	...	14	...	...	...	...	...	...	2	...	1	1	...	...	1	...	9	1	...	...	1	
25	1	...	...	...	...	2	...	...	3	15	...	3	...	...	...	...	1	...	2	2	...	...	...	...	14	2	...	2	2
26	1	2	13	...	18	...	...	...	1	...	2	...	...	...	1	1	4	...	...	8	2	...	2	...	
27	...	1	...	...	...	2	...	3	...	8	...	...	2	1	...	...	2	1	...	2	...	2	...	...	4	...	...	...	1
28	3	...	...	...	13	...	...	...	1	...	1	...	...	...	1	...	3	...	...	10	...	...	...	...
29	6	...	2	...	14	...	1	1	...	...	1	...	...	...	1	2	3	...	...	17	2	...	...	1	
30	4	...	1	1	13	...	...	...	...	...	...	1	...	...	1	...	4	...	1	8	...	...	...	...
31	1	...	...	2	17	...	...	...	1	...	1	1	...	...	...	1	3	...	1	18	1	...	...	2	
32	2	...	...	...	...	2	...	...	...	10	...	...	3	...	...	...	...	...	...	3	1	4	...	...	7	1	1	...	1
33	1	...	...	2	2	...	...	9	...	...	...	...	...	1	2	...	5	1	1	...	...	...	10	1	...	...	1	
34	1	...	...	...	2	...	...	...	...	11	...	...	...	1	...	...	...	...	6	15	...	3	...	...	9	...	...	...	...
35	1	...	...	1	...	1	...	...	1	23	...	...	...	...	1	1	...	...	2	6	4	3	...	...	6	1	...	...	...
36	6	...	...	...	20	...	1	...	...	...	...	...	...	4	5	1	...	...	...	5	...	...	...	...
37	2	...	...	2	...	1	...	19	...	5	1	...	...	...	1	...	...	3	...	2	...	...	9	2	...	...	1	
38	2	...	1	...	19	...	...	...	...	...	2	...	...	11	10	...	5	...	...	11	1	...	...	...
39	1	...	10	...	...	...	1	...	...	...	...	6	17	...	4	...	...	...	...	...	...	...
40	1	1	...	1	...	14	...	2	...	2	...	...	...	1	...	6	...	4	...	1	7	7	...	...	...
41	1	6	1	5	1	1	...	4	5	1	1
42	2	...	3	...	14	1	...	3	1	...	3	8	1
43	8	17	1	1	1	1	1	...	2	5	1	4	1
44	1	...	2	...	15	...	1	1	...	3	1	1	2	...	2	...	8	1
45	1	...	...	...	...	2	1	1	...	6	...	...	...	...	...	...	...	...	...	2	...	4	...	...	13	2	...	...	...
46	5	...	...	2	...	...	6	...	...	...	...	...	...	1	2	...	4	...	...	8	1	...	...	...
47	4	1	...	2	20	...	...	...	...	...	...	...	...	...	4	...	3	...	...	6	1	...	...	...
48	...	1	...	...	...	2	...	1	...	18	1	...	...	1	...	...	...	...	6	3	...	2	...	...	2	...	...	...	...
49	1	...	2	...	11	...	...	...	...	...	...	...	...	...	4	...	2	...	...	9	2	...	...	...
50	3	...	2	...	20	...	1	...	...	...	2	...	...	...	15	2	4	...	...	1	11	...	1	...	
51	1	...	1	...	7	...	...	...	1	...	1	...	...	...	...	...	2	...	...	5	2	...	...	...
52	3	...	...	...	7	...	...	...	2	...	...	...	...	1	...	...	...	...	...	5	...	...	...	...
53	1	...	2	...	1	...	6	...	...	...	1	...	...	1	...	...	1	...	2	...	...	2	4	1	...	...
Total	9	5	8	6	3	124	6	72	15	654	4	37	13	35	3	37	20	3	58	147	22	125	1	13	490	49	6	25		

TABLE SHOWING THE INCIDENCE OF INFECTIOUS DISEASES IN EACH STATISTICAL DISTRICT
FOR THE YEAR ENDED 31ST DECEMBER, 1952.

Statistical District.	Acute Rheumatism.	Amoebiasis.	Ankylostomiasis.	Brucellosis.	Chorea.	Diphtheria.	Dysentery (Amoebic).	Dysentery (Bacillary).	Infantile Diarrhoea.	Infective Hepatitis.	Lead Poisoning.	Leprosy.	Malaria.	Meningococcal Infection.	Paratyphoid.	Poliomylitis.	Pleural Effusion.	Puerperal Fever.	Purulent Ophthalmia.	Rubella.	Salmonella Infection.	Scarlet Fever.	Trachoma.	Tetanus.	P.T.B.	Other T.B.	Typhoid Fever.	Typhus Fever.
Albany Municipality	2	...	...	...	...	...	...	...	...	...	1	...	1	...	...	1	...	...	...	...	9	1	...
Boulder Municipality	24	...	...
Bunbury Municipality	5	...	...	...	18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carnarvon Municipality	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Claremont Municipality	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cottesloe Municipality	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fremantle Municipality	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fremantle, East, Municipality	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fremantle, North, Municipality
Geraldton Municipality
Guildford Municipality	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kalgoorlie Municipality
Midland Junction Municipality	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Narrogin Municipality
Northam Municipality
Perth Municipality	16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Subiaco Municipality	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wagin Municipality
York Municipality
Albany Road Board
Armadale-Kelmscott Road Board
Ashburton Road Board
Augusta-Margaret River Road Board
Balingup Road Board	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Basendean Road Board
Bayswater Road Board
Belmont Park Road Board
Beverley Road Board
Black Range Road Board
Bridgetown Road Board
Brookton Road Board
Broome Road Board
Broomehill Road Board
Bruce Rock Road Board
Busselton Road Board	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canning Road Board
Capel Road Board
Carnamah Road Board
Chittering Road Board
Collie Coalfields Road Board
Coolgardie Road Board
Corrigin Road Board
Cranbrook Road Board
Cranbrook Road Board -
Cuballing Road Board
Cue Road Board
Cue Road Board
Cunderdin Road Board
Dalwallinu Road Board
Dandagan Road Board
Dardanup Road Board
Darling Range Road Board
Denmark Road Board
Dowerin Road Board
Drakesbrook Road Board

Statistical District.	Acute Rheumatism.	Amoebiasis.	Ankylostomiasis.	Brucellosis.	Chorea.	Diphtheria.	Dysentery (Amoebic).	Dysentery (Bacillary).	Infantile Diarrhoea.	Infective Hepatitis.	Lead Poisoning.	Leprosy.	Malaria.	Meningococcal Infection.	Paratyphoid.	Poliomylitis.	Pleural Effusion.	Puerperal Fever.	Purulent Ophthalmia.	Rubella.	Salmonella Infection.	Scarlet Fever.	Trachoma.	Tetanus.	P.T.B.	Other T.B.	Typhoid Fever.	Typhus Fever.
Dumbleyung Road Board																												
Dundas Road Board																												
Esperance Road Board																												
Fremantle Road Board																												
Gascoyne-Minilya Road Board								1		4			1								2	1						
Geraldton Road Board																												
Gingin Road Board																												
Gnowangerup Road Board																												
Goomalling Road Board	1							1		1																		
Gosnells Road Board		1								2																		
Greenbushes Road Board										2																		
Greenough Road Board																												
Halls Creek Road Board																												
Harvey Road Board					1					38											4							
Irwin Road Board														1							2							
Kalgoorlie Road Board																												
Katanning Road Board																												
Kellerberrin Road Board										3												4						
Kent Road Board										2																		
Kojonup Road Board	1																											
Kondinin Road Board																												
Koorda Road Board	1							3																				
Kulin Road Board																												
Kununoppin-Trayning Road Board																												
Lake Grace Road Board									3	28										1								
Laverton Road Board																												
Leonora Road Board				1																								
Mandurah Road Board																												
Manjimup Road Board																												
Marble Bar Road Board										10					1						1							
Marradong Road Board																												
Meekatharra Road Board										1																		
Melville Road Board										22																		
Menzies Road Board																												
Merredin Road Board										2																		
Mingenew Road Board										1																		
Moora Road Board										1																		
Morova Road Board																												
Mosman Park Road Board										2																		
Mt. Marshall Road Board										1																		
Mt. Magnet Road Board																												
Mukinbudin Road Board																												
Mullewa Road Board								7	3	1																		
Mundaring Road Board								1		19																		
Murchison Road Board																												
Murray Road Board																												
Nannup Road Board																												
Narembeen Road Board																												
Narrogin Road Board																												
Nedlands Road Board																												
Northam Road Board								4		6																		
Northampton Road Board								2		5																		
Nullagine Road Board																												
Nungarin Road Board																												
Peppermint Grove Road Board																												
Perenjori Road Board										1																		
Perth Road Board	1							4		30							2											
Phillips River Road Board										1																		

APPENDIX XXIV.
VENEREAL DISEASE IN WESTERN AUSTRALIA.
1951-1952.

Disease.	Male.		Female.		Total.	
	1951.	1952.	1951.	1952.	1951.	1952.
Syphilis—						
Primary	26	11	11	4	37	15
Secondary	5	3	7	3	12	6
Tertiary	6	7	5	7	11	14
Congenital	1	3	5	1	6	4
Total Syphilis	38	24	28	15	66	39
Gonorrhoea	228	134	33	39	261	173
Chancroid	1	2	....	....	1	2
Granuloma	*3	2	7	2	10	4
Total	270	162	68	56	338	218

* Native.

APPENDIX XXV.
MATERNAL MORTALITY.

Period.								Average Live Births.	Average Maternal Deaths.	Average Rate.
1901-1905	....	....	....	....	....	....	....	6,681	28·0	4·19
1906-1910	....	....	....	....	....	....	....	7,691	43·4	5·64
1911-1915	....	....	....	....	....	....	....	8,844	39·4	4·46
1916-1920	....	....	....	....	....	....	....	7,727	41·4	5·36
1921-1925	....	....	....	....	....	....	....	8,056	34·2	4·25
1926-1930	....	....	....	....	....	....	....	8,748	46·8	5·35
1931-1935	....	....	....	....	....	....	....	8,062	35·4	4·39
1936-1940	....	....	....	....	....	....	....	8,877	32·4	3·65
1941-1945	....	....	....	....	....	....	....	10,408	24·4	2·34
1946-1950	....	....	....	....	....	....	....	13,130	21·4	1·63

Year.			Live Births.	Deaths from.									
				Puerperal Septicaemia.		Other Puerperal Infections.		Abortion.		All Other Complications of Pregnancy and of the Puerperal State.		All Complications of Pregnancy and the Puerperal State.	
				No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
1943	....	....	10,481	2	0·19	1	0·10	3	0·29	17	1·62	23	2·19
1944	....	....	10,870	2	0·18	2	0·18	5	0·46	18	1·66	27	2·48
1945	....	....	10,672	....	....	2	0·19	5	0·47	13	1·22	20	1·87
1946	....	....	12,105	....	....	3	0·25	5	0·41	18	1·49	26	2·15
1947	....	....	12,874	1	0·08	1	0·08	8	0·62	22	1·71	32	2·49
1948	....	....	12,981	2	0·15	4	0·31	1	0·08	13	1·00	20	1·55
1949	....	....	13,511	....	....	2	0·15	3	0·22	11	0·81	16	1·18
1950	....	....	14,228	....	....	2	0·14	1	0·07	12	0·84	13	0·91
1951	....	....	14,794	....	....	2	0·14	3	0·20	11	0·74	16	1·08
1952	....	....	15,413	....	....	3	0·19	3	0·19	12	0·78	18	1·17

All rates per thousand live births.

APPENDIX XXVI.
STILLBIRTH AND INFANT MORTALITY RATES.

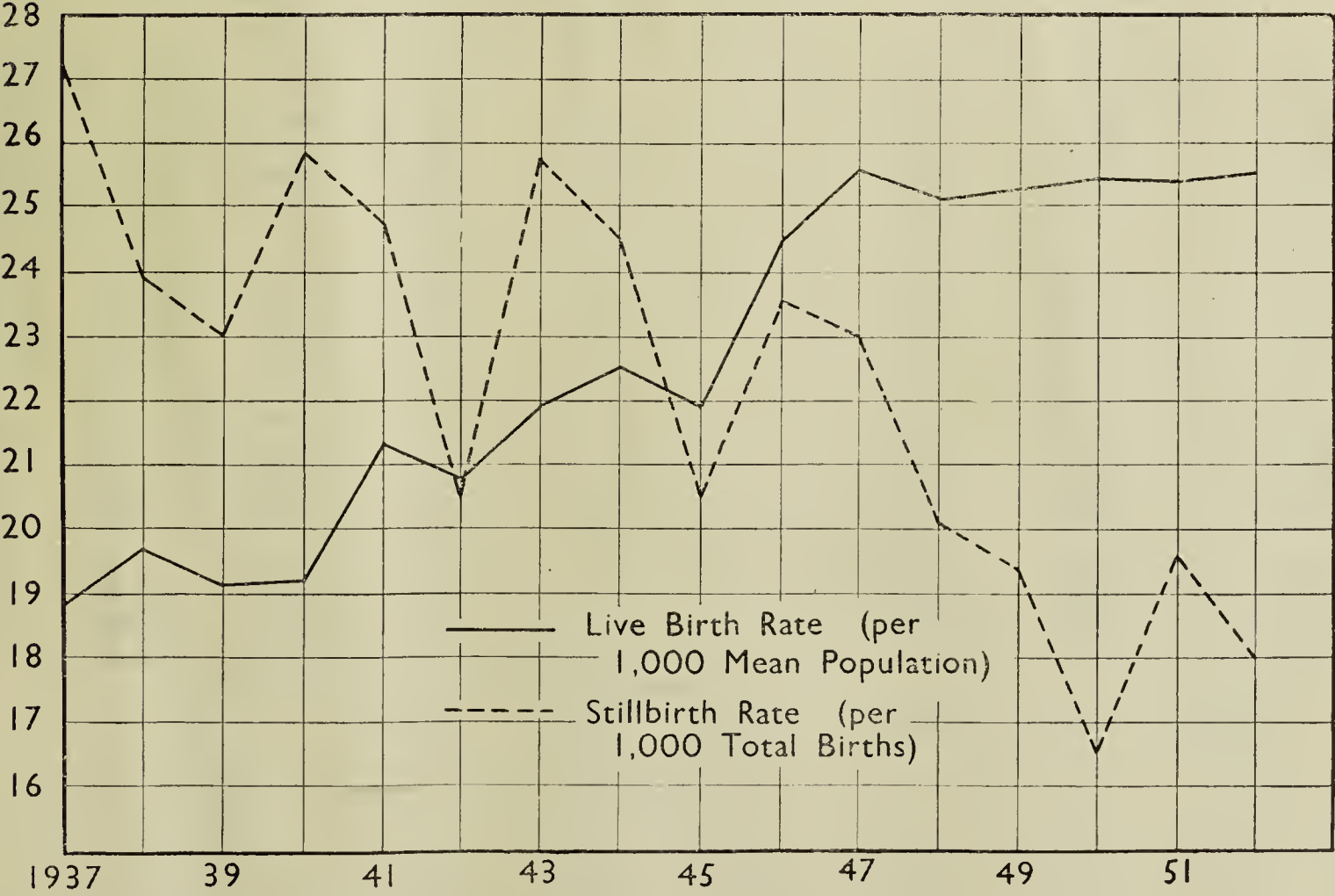
Year.	Total Births including Stillbirths.	Stillbirth Rates.	Neo-Natal Rates.		Total Mortality Rates under One Year.	Other Post Natal Rates—Over One Month and under One Year.
			Under One Week.	Under One Month.		
1926	8,534	27·4	....	27·6	48·0	20·4
1927	8,708	26·0	....	23·0	44·7	21·7
1928	8,981	30·9	....	23·1	35·5	12·4
1929	9,316	28·4	18·8	25·8	54·6	28·8
1930	9,456	27·0	18·0	23·5	46·5	23·0
1931	8,777	26·0	20·1	26·6	40·5	13·9
1932	8,175	25·7	21·02	25·2	43·5	18·3
1933	8,105	29·4	18·1	22·5	35·8	13·3
1934	8,029	29·2	19·3	24·8	38·8	14·0
1935	8,377	30·8	20·6	24·8	39·0	14·2
1936	8,730	28·9	19·6	24·8	41·0	16·2
1937	8,850	27·2	16·8	21·2	36·5	15·3
1938	9,325	23·9	16·6	19·1	33·1	14·0
1939	9,249	23·0	16·5	19·7	40·0	20·3
1940	9,363	25·9	20·5	24·9	43·0	18·1
1941	10,375	24·8	15·1	18·1	34·4	15·7
1942	10,109	20·6	17·1	20·3	36·2	15·9
1943	10,759	25·8	17·1	21·0	31·8	10·8
1944	11,144	24·8	18·6	21·0	32·0	11·0
1945	10,896	20·6	18·0	20·0	28·9	8·9
1946	12,398	23·6	17·1	20·6	30·3	9·6
1947	13,178	23·0	16·9	19·4	30·2	13·2
1948	13,197	20·1	16·9	18·7	25·0	8·4
1949	13,779	19·4	16·2	19·0	25·9	6·8
1950	14,468	16·6	16·2	18·0	26·7	8·6
1951	15,091	19·7	16·2	19·7	28·2	8·5
1952	15,696	18·0	15·5	17·6	24·5	6·8

In above table all rates are calculated in deaths per 1,000 of total births, including stillbirths.

APPENDIX XXVII.
WESTERN AUSTRALIA—STILLBIRTH AND BIRTH RATES.

Year.	Mean Population.	Live Births.		Still Births.	
		Number.	Rate per 1,000 Mean Population.	Number.	Rate per 1,000 Total Births.
1937	457,328	8,609	18.82	241	27.23
1938	463,808	9,141	19.71	224	23.92
1939	469,780	9,036	19.23	213	23.03
1940	473,397	9,121	19.27	242	25.85
1941	473,988	10,118	21.35	257	24.77
1942	476,619	9,901	20.77	208	20.57
1943	476,745	10,481	21.98	278	25.84
1944	481,498	10,870	22.58	274	24.59
1945	487,510	10,672	21.89	224	20.56
1946	492,771	12,105	24.57	293	23.63
1947	502,978	12,874	25.60	304	23.07
1948	514,843	12,931	25.12	266	20.16
1949	533,083	13,511	25.35	268	19.45
1950	558,709	14,228	25.47	240	16.59
1951	581,459	14,794	25.44	297	19.68
1952	602,025	15,413	25.60	283	18.03

WESTERN AUSTRALIA—LIVE BIRTH AND STILLBIRTH RATES.



APPENDIX XXVIII.
DIPHTHERIA MORTALITY AND MORBIDITY.
WESTERN AUSTRALIA, (1902-1952)

Year.	Mean Calendar Population.	Notifications Received.	Deaths.			Case Mortality.	Incidence Rate per 100,000 Population.	Mortality Rate per 100,000 Population.
			Diphtheria.	" Group."	Total.			
1902	204,705	73	8	1	9	% 12.33	35.6	4.39
1903	219,643	81	18	4	22	27.16	36.8	10.01
1904	233,963	216	35	5	40	18.52	92.3	17.09
1905	246,681	228	35	5	40	17.54	92.4	16.21
1906	254,362	347	59	6	65	18.73	136.4	25.55
1907	255,510	821	64	5	69	8.40	321.3	27.00
1908	257,822	1,719	106	5	111	6.45	666.7	43.05
1909	263,279	1,221	75	6	81	6.63	463.8	30.76
1910	271,019	1,066	62	7	69	6.47	393.3	25.46
1911	286,712	764	36	1	37	4.71	266.4	12.55
1912	301,040	634	28	7	35	5.52	210.6	11.62
1913	313,383	957	44	2	46	4.80	305.3	14.67
1914	322,668	785	37	3	40	4.72	243.2	11.46
1915	321,247	1,045	38	2	40	3.63	325.2	11.82
1916	313,066	757	25	8	33	3.30	241.8	7.99
1917	306,339	800	31	1	32	3.87	261.1	10.11
1918	308,198	1,277	26	1	27	2.11	414.3	8.95
1919	319,955	971	32	1	33	3.39	303.4	10.31
1920	330,023	1,080	46	4	50	4.62	327.2	15.15
1921	334,084	958	....	....	44	4.59	286.7	13.17
1922	341,375	377	17	4	21	3.6	169.0	6.12
1923	350,772	504	18	2	20	3.97	143.6	5.70
1924	363,152	511	....	....	14	2.7	140.7	3.85
1925	372,970	334	....	....	6	1.7	94.9	1.60
1926	380,930	256	....	....	11	4.3	67.2	2.88
1927	392,071	273	....	....	6	2.9	69.6	1.53
1928	407,576	639	....	....	13	2.0	156.7	3.19
1929	420,756	539	....	....	33	6.0	128.1	7.84
1930	429,079	1,045	....	....	43	4.1	243.5	10.02
1931	432,347	452	....	....	19	4.2	104.5	4.39
1932	435,041	664	....	....	20	3.0	152.6	4.59
1933	438,780	848	....	....	20	2.4	193.2	4.55
<i>Mass Immunisation Commenced.</i>								
1934	442,354	974	....	....	36	3.7	220.1	8.13
1935	446,874	1,308	....	....	35	2.6	292.7	7.83
1936	452,294	792	....	....	36	4.54	175.2	7.95
1937	457,328	1,166	....	....	39	3.34	259.3	8.52
1938	463,808	921	....	....	41	4.44	198.5	8.83
1939	469,780	610	....	....	27	4.4	129.9	5.74
1940	473,397	583	....	....	22	3.75	123.1	4.64
1941	473,988	674	....	....	20	3.00	142.1	4.21
1942	476,619	748	....	....	41	5.48	156.9	8.60
1943	476,745	755	....	....	38	5.03	158.3	7.97
1944	481,498	528	....	....	24	4.80	109.6	4.98
1945	487,510	425	....	....	20	4.70	87.1	4.10
1946	492,771	380	....	....	11	2.89	77.1	2.23
1947	502,978	339	....	....	8	2.36	67.3	1.59
1948	514,843	255	....	....	7	2.74	49.5	1.35
1949	533,083	170	....	....	4	2.35	31.88	0.75
1950	558,709	172	....	....	7	4.07	30.78	1.25
1951	581,462	271	....	....	11	4.06	46.60	1.89
1952	602,026	124*	....	....	2	1.61	20.60	0.33

* Amended Diagnosis.

MEAT INSPECTION FOR THE YEAR ENDED 31ST DECEMBER, 1952.

Totals of Animals Slaughtered—Cattle, 80,953 ; Calves, 27,950 ; Sheep, 838,204 ; Pigs, 115,918.

TOTAL NUMBER OF ANIMALS SLAUGHTERED AND INSPECTED IN COUNTRY DISTRICTS WHERE MEAT
INSPECTION IS CARRIED OUT.

District.	Cattle.	Sheep.	Calves.	Pigs.	Totals.
Albany.	2,065	45,700	894	998	49,657
Bunbury	2,101	15,427	871	233	18,632
Busselton	944	6,203	26	151	7,324
Collie	726	3,891	42	180	4,839
Geraldton	996	17,721	98	750	19,565
Harvey	2,071	13,346	349	631	16,397
Katanning	728	5,686	53	135	6,602
Merredin	201	2,584	19	65	2,869
Narrogin	912	6,478	309	82	7,781
Northam	1,801	16,090	120	1,473	19,484
Wagin	339	2,886	23	140	3,388
York	463	3,979	41	201	4,684
Totals	13,347	139,991	2,845	5,039	161,222

APPENDIX XXX.

REVENUE AND EXPENDITURE FOR YEAR 1952.

REVENUE.

	£	s.	d.
Licence Fees	66	0	0
Meat Inspection Fees	8,732	4	11
Fish Inspection Fee	398	7	11
Pathological Laboratory	1,399	11	0
Sanitation Refunds	208	2	2
Inspection of Plans (Septic Tanks)	3,276	14	0
Miscellaneous	1,343	17	9
Nurses and Midwives Registration and Examination Fees	1,773	5	6
Local Health Authority Recoups	149	13	10
T.B. Diagnosis (Generally)	198,340	1	0
T.B. Diagnosis (Wooroloo)	25,944	1	5
Argentine Ants (Sale D.D.T. and Baits)	6,403	9	4
Health Supervision Charges	746	15	4
Maintenance Northern Territory Natives, Derby Leprosarium	1,051	7	0
	£249,823	11	2

EXPENDITURE.

	£	s.	d.
Salaries	295,905	5	8
Payments Local Health Authorities	18,024	6	3
School Hygiene	11,294	14	1
Travelling and Transport	3,100	14	0
Postage and Telephones	1,746	2	0
Laboratory	16,833	5	6
Venereal Diseases	3,370	19	11
Miscellaneous	21,905	2	3
Infant Welfare Centres	30,157	19	8
Maintenance and Transport of Lepers	22,857	2	8
Medical Officer and School Dentists Travel	5,619	7	10
Diphtheria Immunisation	60	2	7
T.B. Clinics	209,664	6	3
Argentine Ants	41,734	2	4
Cancer Research	4,514	10	8
Sanitation Government Buildings	15,560	5	10
Total Expenditure	£702,348	7	6

